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The modern journal of classic aeroplanes and the history of flying

Editor's Letter

EXACTLY 60 YEARS ago, Britain's Conservative government published "that" Defence White Paper, in which a radical new direction for the nation's air defence was announced, to howls of fury and outrage in many quarters. The Minister of Defence at the time, Duncan Sandys — whose name to this day still elicits a barrage of boos and hisses — had been tasked with redefining Britain's defence strategy, partly in response to the bruising events at Suez the previous year, but also in light of the increasingly terrifying prospect of all-out nuclear war, the deadly zero-sum game in which there could be only losers. At the heart of Sandys' air-defence proposals was the notion that the tactics employed so effectively during Fighter Command's "finest hour", less than two decades before, would be hopelessly inadequate against a considerably smaller force of Soviet bombers carrying nuclear weapons; if even one reached its target, the consequences would be unimaginable.

Sandys' answer was to switch resources to the development of a network of surface-to-air missile batteries in place of a conventional manned-fighter force, the missiles incorporating the most modern technology to despatch the intruders before they had a chance to release their devastating cargo. What effect would this new direction have on industry, particularly Britain's aircraft manufacturers, those mass-employment "heavy hitters"? In this issue, Professor Keith Hayward FRAeS examines the political and industrial fallout of the infamous document, in the first of a series of specially-commissioned TAH articles celebrating — or commiserating on, depending on your perspective — the 60th anniversary of what came to be known simply as "Sandys"; an ill-conceived act of political recklessness or a vital rationalisation of a failing industry?

FRONT COVER *Hellcat* pilot Lt John Haberfield RNZNVR of No 1839 Sqn aboard HMS Indomitable in 1945. See *The Pacific Express*, which begins on page 64. His flying kit offers a stark contrast to . . .

BACK COVER . . . the high-altitude pressure suit and helmet worn by the aircrew of the high-flying Lockheed Blackbird. See pages 48–59.

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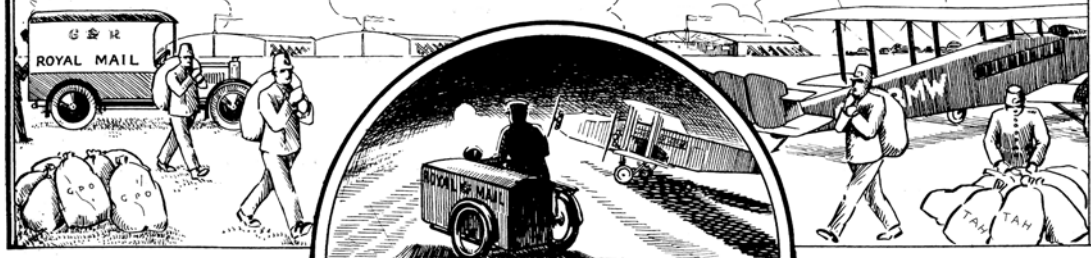
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AIR CORRESPONDENCE



Letters to the Editor

Hillson history

SIR — On reading your interesting feature *Hillson's Horrible Helvellyn* in *TAH18*, I thought you'd be interested in seeing this unusual photograph depicting two of the aircraft's vital components — namely the outer mainplanes. The photograph was passed to me by Carol Agius, the daughter of the late J.G. "Jimmy" Ellison (1919–94), who spent most of his working life with F. Hills & Sons at Stockton and Manchester. You may be interested in a potted history of the company.

F. Hills & Sons Ltd was formed by Francis Hills in 1849 as a one-man joinery company in Yarm-on-Tees. Cooper and Walter Hills (grandsons of Francis) took over in 1907 and during the First World War the company made ammunition boxes and joinery for the Armed Forces. In 1921 Hills became a limited company and in 1933 it

moved to larger premises in Stockton.

The company turned its hand to making aeroplanes after Managing Director W.R. Chown, who was interested in aircraft development, visited Prague in Czechoslovakia to obtain a licence for the manufacture of the Praga Air Baby two-seat light aircraft. Following this he purchased the old Ford Motor Company premises in Trafford Park, Manchester for joinery and aircraft production.

The first aircraft built by Hills was a Pou-du-Ciel, an H.M.14 "Flying Flea" designed for homebuilders by Frenchman Henri Mignet. The aircraft was registered G-ADOU in October 1935 and test flown at nearby Barton Aerodrome.

The first licence-built Praga E.114 was sold to Australia and the second, registered G-AEEU in April 1936, became the company's demonstrator. Total production by Hills amounted to 28 aircraft

The wings of Hillson Helvellyn G-AFKT — see Richard Riding's letter on these pages.



No apologies for repeating this remarkable "mystery" photograph of a unique formation, first published in TAH11 — Bill Harrison provides chapter and verse in his letter below, headed "The Hucknall Air Force".



plus seven uncompleted. There followed two one-off Hillson light aircraft, both designed by Norman Sykes: the Pennine, a two-seat side-by-side high-wing monoplane not dissimilar to the Praga, G-AFBX; and Helvellyn G-AFKT.

During 1938–39 Hills built Avro Anson wings and laminated spars for Airspeed Oxfords. During the war the company produced no fewer than 480,000 Jablo compressed-wood propeller blades and 10 million square feet of aeronautical plywood for the Mosquito and other aircraft. In addition the company produced more than 800 Percival Proctors and the extraordinary slip-wing Hawker Hurricane I after first building and testing the Hillson Bi-Mono research aircraft. An expendable slip-wing was mounted above the fuselage in order to obtain more lift for operating out of small fields. Once the aircraft was airborne the slip-wing could be released by the pilot.

After the war Hills returned to manufacturing for the building trade and also developed interests overseas. In 1969 Hills became part of the Bowater Corporation and in the mid-1980s Bowaters sold the company to Sarek of Sweden, becoming Crosby Sarek in 1990.

With Hills's overseas interests Jimmy Ellison

travelled extensively with his job, often to Germany, Sweden, Holland and Saudi Arabia, as well as making several trips to Africa, some lasting several months, to Takoradi, Ghana (then called the Gold Coast), and to Libreville, Gabon.

I cannot add anything to Philip Jarrett's thorough article on the Helvellyn, but should I come across any colour air-to-air photographs of that camera-shy assortment of plywood I'll let you know!

Richard T. Riding Radlett, Hertfordshire

The Hucknall Air Force

SIR — Looking through some back issues of *TAH*, I can add an answer to the "Mystery Picture: Rolls-Royce formation" in the *Air Correspondence* pages in TAH11.

Known as The Hucknall Air Force, this picture was taken by John Yoxall of *Flight* magazine on November 4, 1947, from another Rolls-Royce aircraft, Avro Lancaster PP779, flown by R-R pilot Partington. From left to right, the aircraft/pilots were: Hornet PX288/Dick Peach; Trent Meteor EE227/Andrew McDowall; Nene Lancastrian VH742/Mike Graves; Meteor RA439/Jim Heyworth; Nene Vampire TX807/

Pembrokes in pictures — see Tom Singfield's letter on these pages. Just visible here under the fuselage of Pembroke C(PR) Mk 1 XL953 are the sliding door runners covering the photo-recce version's vertical camera windows. Other cameras could be housed in a removable cabin frame and took images through optically flat side windows. The PR Pembrokes were based in West Germany during the Cold War and used in Operation Hallmark to photograph installations inside East Germany while flying along the edges of the Berlin Air Corridors.



TOM SINGFIELD

To extend their life after micro fatigue initiations were found in the wing spars, 14 RAF Pembrokes were re-spurred at BAC Weybridge in 1970–71. The first four to be done are seen in this official photo: XF796, WV736, XF799 and WV735. WV735 took 13 months to modify while the last to be completed, XL954, took only two. Note the cockpit roof bulge in XF799 (second from back) which housed the remote controls for the transponder and HF radio.



BROOKLANDS MUSEUM

Harvey Heyworth. I believe there was another picture taken with the addition of a Firefly off to the right and a Vampire (I think?) on the left.

The Nene Lancastrian, VH742, became a unique historical aircraft because, before it flew with Nenes installed in the outboard positions, the only people who had flown under turbine power were company test pilots, flight test observers and military aircrew. Many dignitaries from the world of aviation and aviation press then flew in VH742 and were impressed by its uncanny smoothness when flying with the two Merlins shut down.

Bill Harrison Derby

Pembroke particulars

SIR — As an Air-Britain Specialist on the Percival Prince and Pembroke, I'd like to correct a couple of errors in *Off the Beaten Track* in TAH18.

The RAF had 59 Pembrokes, not 55. However, two of the 59 were quickly sent to the Southern Rhodesia Air Force after initial flying in RAF marks. Malawi never had Pembrokes.

Military operators of the Pembroke, and the total numbers acquired, are as follows:

RAF	59	(2 to Rhodesia)
Germany	33	(1 converted from a President)
Sweden	18	(2 ex Danish)

Belgium	12	
Denmark	7	(1 converted from a President, 2 to Sweden)
Sudan	4	(1 ex WGAF, 2 converted from Presidents and 1 short-term loan)
Finland	2	
Southern Rhodesia	2	
Rhodesia	2	(ex Southern Rhodesia)
Northern Rhodesia	2	(ex Rhodesia)
Zambia	2	(ex Northern Rhodesia)

The 59 RAF Pembroke orders were divided into four contracts as follows.

Contract No 6/Acft/6847/C.B.5(a) dated 5.6.51:
42 Pembroke C Mk 1s delivered between March 1953

and June 1956 with serials WV698–WV712, WV729–WV753, XK884–XK885

Contract No 6/Acft/10009/C.B.5(a) dated 9.11.53:
4 Pembroke C Mk 1s delivered between June and July 1956 with serials XK859–XK862

Contract No 6/Acft/12518/C.B.5(a) dated 21.9.55:
6 Pembroke C(PR) Mk 1s delivered between March 1956 and October 1956 with serials WV754–WV755, XF796–XF799

Contract No. 6/Acft/13975/C.B.5(a) dated 25.9.56:
3 Pembroke C Mk 1s and 4 Pembroke C(PR) Mk 1s delivered between June 1957 and April 1958 with serials XL929–XL931 (C Mk 1), XL953–XL956 (C(PR)Mk 1)

Tom Singfield Horsham, West Sussex



RACE 41 How TAH inspired a Hawker Hurricane model

DURING CONVERSATION towards the end of 2015 with Editor Nick, I was struck with his knowledge of — and affection for — Hawker Hurricane IIC PZ865 in its civilian guise, particularly as G-AMAU in its King's Cup Air Race markings of 1950 and 1951. What an idea for an unusual model! That was the easy bit, as research showed different engine and exhaust fittings; and other changes which included the fairing over of the spent cartridge chutes under the wings and for 1951 the removal of the radio mast. These were relatively easy to deal with, especially by referring to *TAH* issue 5, which included a comprehensive set of pictorial references, with clear captions.

There was, however, a poser about the bulges on the wing upper surfaces over the cannon breeches. The photos in *TAH* seem to show that they had been removed, but an article by a modeller in the USA avers most emphatically that they were still in situ. It was not possible to refer this conundrum to Nick, as the model was meant as a surprise gift for him.

Fortunately Managing Editor Mick promptly came to the rescue with a download of a short clip of film showing clearly the flush surfaces of the upper wing

The kit chosen was Hasegawa's 1/72nd-scale model of *The Last of the Many*, albeit in its military guise.

The exhausts had to be changed for the six-stubs-per-side variant (see the picture on page 30 of *TAH5*), the armament removed, the cannon bulges filed down and the spent cartridge chutes filled. As the canopy was to be displayed open, the cockpit was made to look "busy" by the use of Eduard coloured etchings, and a Squadron Signal replacement canopy fitted with the canopy slid back.

The aircraft was finished in Hawker's house colour of royal blue, and getting the right shade was not easy; some models of G-AMAU have been finished in an incorrect, darker, shade. As it happened, spray priming the model with Halfords acrylic white primer gave a slightly lighter shade to the Humbrol acrylic midnight blue which was sprayed on as the top coat, and it does

compare well with many of the published colour photos. The glorious gold markings which include the 1950 and 1951 schemes are produced in transfer form by Lifelike in Japan and should be available online. They are crisply printed and adhere well, giving the appearance that they have been painted on.

Making the model was much more interesting than normal construction straight out of the box, and I shall look for other possible subjects in the pages of *TAH*.

FRED CROSSKEY



15. The strength of the assigned light bomber force in the United Kingdom is now 160 aircraft. This will fall to 80 aircraft in March 1958, but I think it was clearly indicated in last year's Annual Review that it was planned to reduce it to 100 aircraft so there is not much change. Despite the fall in numbers the equipment of the Canberras with a nuclear strike capability will substantially increase their striking power and effectiveness. However, in order to improve the flexibility and training of the United Kingdom-based Canberras my authorities will be very willing to discuss with SACEUR arrangements for regular detachment of Canberra squadrons to the mainland of Europe for training and exercise purposes.

16. At the same time, I would like to remind the Council that in March, 1958, the United Kingdom's contribution to the Allied nuclear deterrent, which will be employed in the support of NATO, will be substantial and will continue to build up thereafter.

17. In our submission to the Annual Review 1956, we also declared 11 squadrons of 88 maritime aircraft. These include 2 maritime squadrons in Malta and these squadrons under our plan is to be reduced to 1 in March 1958. Details of this and other planned maritime aircraft assigned to NATO will be discussed with the Council and to the Supreme Commanders concerned.

Naval Forces

18. My Government is also planning to reduce the coming financial

60 YEARS ON Duncan Sandys
& the 1957 Defence White Paper



Kill or cure?

The view from Whitehall

To mark the 60th anniversary of the publication of the British Government's 1957 Defence White Paper, in which Minister of Defence Duncan Sandys announced a shocking new direction for the nation's air defence, **Prof KEITH HAYWARD FRAeS** explores the impact of the much-maligned document on the era's political, economic and industrial landscape



WHEN IT WAS published 60 years ago, the UK Government's 1957 Defence White Paper seemed to presage a period of profound change for the British aircraft industry. Following a wave of cancelled or curtailed projects, many of the nation's manufacturers would never fully recover and would in due course become the "candidates for relegation" defined by government officials. Some would eventually be swept up in the wave of mergers that began in 1960. This time the government made it clear that there would be no bailing out of ailing firms. Even the survivors faced an uncertain future, either fighting for the few defence contracts left after Minister of Defence Duncan Sandys' axe had fallen, or struggling to launch civil programmes on the back of orders from the two domestic airlines, the British Overseas Airways Corporation (BOAC) and British European Airways (BEA). This apparently tough line on civil programmes and future military contracting, however, belied a somewhat more positive view of an industry still well regarded as a generator of national economic wealth and as a strategic asset.

The Conservative Government's response to the 1957 Defence White Paper had two related dimensions. The first was a desire to nudge the aircraft industry into a stronger, more rational structure; the second was to focus research and development (R&D) on a number of advanced civil projects. In the best Whitehall tradition, a committee was established to review the state

of the industry and its prospects, and to sketch out a future beyond the '57 White Paper. This was the Aircraft Industry Working Party (AIWP). Unlike that of its better-known successor, the Plowden Committee of 1964–65, the AIWP's report was never intended for publication at the time, but it does provide a fascinating insight into government thinking about the future of the UK aircraft industry as the austere 1950s turned the corner into the swinging Sixties.

In the event, the central tenets of the policy that emerged in the wake of what came to be referred to simply as "Sandys", based on hopes of creating an increasingly self-funded, self-rationalised industry, quickly fell by the wayside. By 1959 Sandys, who became the first Minister of Aviation that October, was intervening directly to drive home the rationalisation process, promising direct financial aid for civil developments. Less than two years later the government launched a new generation of civil and military projects, several in collaboration with the French, including Concorde. For just a few years, the UK aircraft industry seemed to have recovered much of the government support it had lost in 1957.

CUTS AND BRUISES

In some respects, an earlier round of cuts and cancellations during 1955–56 had anticipated the Sandys White Paper. The 1956 Defence White Paper had already stated that in the future there would be an increased reliance on guided weapons. There was also a hint of what might be done to encourage a much-needed rationalisation

TOP The publication of the 1957 Defence White Paper on April 4 that year coincided with the maiden flight of the first English Electric P.1B, XA847. The paper called for an air-defence strategy relying on ground-based guided missiles, but development of the Lightning (as it became) was deemed too far advanced for it to be cancelled.



ABOVE The RAF's state-of-the-art all-weather interceptor when the 1957 Defence White Paper was published was the Gloster Javelin, which had entered service in February 1956. The type was the last aircraft to bear the Gloster name, and the company was eventually absorbed into the Hawker Siddeley Aviation conglomerate in October 1961.

of a fragmented industry, using a "selective allocation of contracts to bring about [a] measure of coalescence in the aircraft industry".¹

Nevertheless, the statement delivered by Sandys in April 1957 was seen as presenting a massive challenge to the UK aircraft industry. Veteran aviation journalist (and Vickers public relations manager) Charles Gardner described it as the "biggest shock ever to be delivered to the UK aircraft industry".² With some 70 per cent of the British aircraft industry's output dependent on military contracting, few firms would remain unscathed. The Hawker Siddeley Group (HSG) was hit especially hard, with the cancellation of the Avro 730 supersonic bomber [although Chris Gibson asserts in *Vulcan's Hammer: V-Force Aircraft and Weapons Projects Since 1945* (Hikoki Publications, 2011) that this was cancelled by the Air Staff a matter of weeks before the 1957 Defence White Paper was issued — Ed.], the supersonic Hawker Hunter and the "thin-wing" development of the Gloster Javelin. Even the much-vaunted shift to guided weapons was based on far-from-secure grounds, with a raft of development projects a long way from production, many of which would subsequently also be subject to cancellation.³

The first detailed top-level consideration of the industrial impact of the White Paper came in July 1957, when the Cabinet discussed a memorandum from Aubrey Jones, the Minister of

Supply. The aircraft industry would be the most severely affected by the cuts, which would also affect all the armed forces and the suppliers of their equipment, and "the outlook seemed bleak for considerable sections". He noted that while the effects of the cuts had so far been mild, "they are likely to become fully apparent only over the next two to three years". Jones continued: "On the R&D side, defence firms, while abstaining from new recruitment, appear to be striving to maintain the strength of their teams of technologists in the hope of getting some new military design work in the relatively near future. This situation cannot, however, last very long. On the production side, the heaviest cuts have occurred on conventional weapons, but requirements for these had been shrinking for several years, and the impact of the further reductions has so far been fairly easily absorbed. The decline in aircraft production is likely to be a fairly gradual process".⁴

Several firms were likely to be so badly hit that their very survival was in question. These included Hawker, Gloster, Armstrong Siddeley and Avro (all part of HSG), and Handley Page, Fairey, Bristol and Saunders-Roe. Some were more valued than others. Avro was "a particularly well-equipped organisation, and [its] disappearance would be a major loss". Gloster was unlikely to last much beyond the end of Javelin production. Hawker's Blackpool factory was to close, and the same

THE SHAPE OF THINGS TO COME

THE 1957 DEFENCE STATEMENT



DUNCAN SANDYS' OUTLINE of future defence policy announced in a statement issued on April 4, 1957, was published by Her Majesty's Stationery Office in a pamphlet entitled *Defence — Outline of Future Policy*. It began with a broad review of the shape of things to come and discussed the nation's vital need to protect its economic structure. It stated that "the defence pattern is to be reshaped progressively over the next five years" and that "for the first fiscal year an overall saving of some £79m is envisaged". Presented here are selected parts of the pamphlet, detailing its central tenets.

PROTECTING THE ECONOMIC STRUCTURE

"The trend is towards the creation of integrated allied forces. Therefore, provided each member nation plays its fair part in the joint effort, it is not necessarily desirable that each should seek to contribute national forces which are by themselves self-sufficient and balanced in all respects. But whatever yardstick is taken, it is impossible to escape the conclusion that Britain has been bearing a disproportionately large share of the total burden of Western defence. Moreover, in assessing the value of her military effort, it must be remembered that, apart from the United States, Britain alone makes a contribution to the nuclear deterrent power upon which the peace of the world so largely rests.

"It must be frankly recognised that there is at present no means of providing adequate protection for the people of this country against the consequences of an attack with nuclear weapons. Though, in the event of war, the fighter aircraft of the RAF would unquestionably be able to take a heavy toll of enemy bombers, a proportion would inevitably get through. Even if it were only a dozen, they could with megaton bombs inflict widespread devastation. This makes it more than ever clear that the overriding consideration in military planning must be to prevent war rather than prepare for it.

"While comprehensive disarmament remains among the foremost objectives of British foreign policy, it is unhappily true that, pending International agreement, the only existing safeguard against major aggression is the power to threaten retaliation with nuclear weapons."

THE NUCLEAR DETERRENT

"The free world is today mainly dependent for its protection upon the nuclear capacity of the United States. While Britain cannot by comparison make more than a modest contribution, there is a wide measure of agreement that she must possess an appreciable element of nuclear deterrent power of her own. British atomic bombs are already in steady production and the RAF holds a substantial number of them. A British megaton weapon has now been developed. This will shortly be tested and thereafter a stock will be manufactured.

"The means of delivering these weapons is provided at present by medium bombers of the V-class, whose performance in speed and altitude is comparable to that of any bomber aircraft now in service in any other country. It is the intention that these should be supplemented by ballistic rockets.

"Since peace so largely depends upon the deterrent fear of nuclear retaliation, it is essential that a would-be aggressor should not be allowed to think he could readily knock out the bomber bases in Britain before their aircraft could take off from them. The defence of the bomber airfields is therefore an essential part of the deterrent and is a feasible task. A manned fighter force, smaller than at present but adequate for this limited purpose, will be maintained and will progressively be equipped with air-to-air guided missiles. Fighter aircraft will in due course be replaced by a ground-to-air guided missile system.

"The aircraft of the Second Tactical Air Force in Germany will be reduced to about half their present number by the end of March 1958. This reduction will be offset by the fact that some of the squadrons will be provided with atomic bombs. A similar reduction will be made in the light bomber force in England, which is assigned to Nato."

THE AIRCRAFT PROGRAMME

"If the weapons and equipment of the armed forces are to be kept up to date, an adequate effort on research and development must be continuously maintained. However, in view of the shortage of scientists and technicians in civil industry, it is important to restrict the military programme to those projects which are absolutely essential.

"A central feature of the defence plan is the maintenance of an effective deterrent. High priority will therefore continue to be given to the development of British nuclear weapons suitable for delivery by manned bombers and ballistic rockets. Nuclear warheads are also being evolved for defensive guided missiles.

"The close co-operation with the United States over research on guided missiles and ballistic rockets, initiated under the agreement of 1953, has proved of mutual benefit to both countries and will be maintained and further developed . . . the supply of American rockets should result in savings of time and money.

"Having regard to the high performance and potentialities of the Vulcan and Victor medium bombers and the likely progress of ballistic rockets and missile defence, the Government [has] decided not to go on with the development of a supersonic manned bomber, which could not be brought into service in much under ten years.

"Work will proceed on the development of a ground-to-air missile defence system, which will in due course replace the manned aircraft of Fighter Command. In view of the good progress already made, the Government [has] come to the conclusion that the RAF [is] unlikely to have a requirement for fighter aircraft of types more advanced than the supersonic P.1, and work on such projects will stop."



PHILIP JARRETT COLLECTION

ABOVE English Electric's P.1 was originally conceived in response to Air Ministry Specification F.23/49, which called for a supersonic interceptor capable of destroying high-altitude bombers. The P.1A research prototype, WG760, seen here, first flew in August 1954, but by 1957 the government had begun reshaping its defence policy.

company's Kingston plant was to cut 1,000 jobs from its workforce of 4,500. Although HSG was still in the running for the Canberra replacement, specified to Operational Requirement (OR) 339, its future depended on a private-venture V/STOL project that was hanging by a thread at that time.⁵ Fairey had only the Rotodyne civilian compound helicopter and Saunders-Roe the SR.177 jet-and-rocket-powered interceptor (soon also to be cancelled) in development. Bristol desperately needed more orders for the troubled Britannia airliner. Handley Page's private-venture feeder-liner, the Herald, "did not promise great success" and the company had few prospects after the end of Victor production.⁶ Vickers, with its civil projects (Viscount, Vanguard and VC10) and English Electric, with Canberra production and Lightning development, would be less immediately affected. Both would soon jointly be awarded the prized OR.339 contract.

At the end of 1956 total employment in the aircraft industry stood at nearly 312,000. The Ministry of Supply (MoS) believed that the overall effect of the cuts would be to reduce that number by some 100,000 during the next four to five years (essentially back to pre-Korean conflict rearmament levels). Thereafter, the volume of military aircraft production was likely to be very low and the industry would have to sustain itself principally on civil work and exports. Employment in the most vulnerable firms would be severely affected:

"Many of these people will be aeronautical specialists of one kind or another, and may not

find it easy to obtain suitable employment except in their basic trade. To some extent, of course, they may be absorbed by other firms on civil aircraft work — although the opportunities, certainly in the short term, are limited. It is not unlikely, therefore, that the loss of highly-skilled personnel by emigration from the UK, which has already given some cause for concern, will increase."⁷

Following the Cabinet's deliberations, Prime Minister Harold Macmillan concluded that, given the complexity of the issues, they should be the subject of a "special inter-departmental enquiry". This committee would focus on the prospects for industrial concentration and the level of R&D funding that the government should continue to provide for civil programmes. It was accepted that the industry would increasingly have to look primarily to world markets for its future welfare.⁸ Sir Thomas Padmore, a Treasury official, was chosen to chair what became the AIWP, which started work in the late summer of 1957.

THE PADMORE COMMITTEE

The AIWP comprised officials from the MoS, Ministry of Transport & Civil Aviation (MoTCA), Board of Trade and the Treasury. Its remit was to examine how best to manage the reduction in the size of the UK aircraft industry, explore whether the government should continue to provide financial support, and if so, at what level. The working party spent some time reviewing past policy (including the 1939 decision to suspend civil development and production, and the post-war Brabazon programme of civil aircraft) and



ABOVE LEFT *Sir Thomas Padmore, Permanent Secretary to the Treasury during 1952–62 and head of the Aircraft Industry Working Party formed in the wake of the 1957 Defence White Paper.* **ABOVE RIGHT** *The shape of things to come? An RAF Corporal investigates an early Bristol Bloodhound Mk I at an industry show in the late 1950s.*

the level of current government funding for the industry. Crucially, during 1956–57 some £4.5bn (2017 equivalent) of the industry's total £6.6bn turnover was derived from defence work, mainly business from the Ministry of Defence (MoD). Since 1951 the government had spent some £2.8bn on R&D and capital equipment for research, and £1.8bn in support of production required during the Korean conflict. The government also still owned most of the industry's facilities.⁹

Looking to the future, the effects of the 1957 White Paper would be "severe". Industry employment, then 311,936, was set to fall to 160,000 (the pre-Korean conflict level) by 1961, but, without a successful shift to civil production, this could drop to 60,000 by 1964. Work on guided weapons would not fill the gap, much of it going to electronics companies. If the gloomiest predictions were fulfilled, by the early 1960s the UK defence industry would be below a size sufficient to sustain any major new programme.

The late 1950s and early 1960s would be a critical time for the aircraft industry as it made the transition from dependence on the UK to increased export sales. As the first report from the AIWP noted ominously, "any company which does not in the near future hold a government development contract or has no private venture of its own will know that its days in the aircraft industry are numbered".¹⁰

The AIWP dismissed industry diversification as a viable option for most of the UK aircraft manufacturers. Vickers, English Electric, Hawker Siddeley, Hunting and Westland were diversified

to some extent, and many others were looking to diversify either by acquisition or by using their factories for new business. However, the former was only possible for the few well-resourced firms, and in the latter case "companies are experiencing difficulty in finding products which they can make and others want to buy". Some degree of contraction was therefore inevitable, "but since there will still be a continuing need for a variety of military aircraft, the government will have a direct interest in ensuring that the industry is reorganised efficiently to meet the changed conditions so that these continuing military requirements are met, and met economically".¹¹

The solution was to focus energies on an export-led civil business. The commercial market was predicted to grow at a fast rate into the 1960s. It was forecast that air traffic would double between 1955 and 1961 and again by the end of 1967. This translated into a potential market for up to 8,000 aircraft, worth an estimated £162bn. The UK was already pre-eminent in aero-engines, but "a comparable status has not been won for British civil aircraft", the latter representing only about 14 per cent of the global market. Of the three leading contemporary British airliners — the Comet, Britannia and Viscount — only the latter was proving to be successful; the others were dogged by ill-luck. Hopes for the next generation were pinned on Vickers' VC10 and Vanguard and de Havilland's D.H.121 (later Trident), but international competition would be tough and the small home market was a disadvantage. In addition, the RAF was unlikely ever to buy



ABOVE The experimental mixed-power Saunders-Roe SR.53 made its first flight on May 16, 1957. Designed as a supersonic high-altitude interceptor powered by a de Havilland Spectre rocket and Armstrong Siddeley Viper turbojet, the type was to be developed into the SR.177, which was never built and was cancelled in December 1957.

transport aircraft in sufficient numbers to form a solid launch order.¹²

The future patterns of civil aircraft development were hard to identify, but would undoubtedly imply substantial technological change, accompanied by very high technical and financial risks.¹³ This further underlined the need for larger and more capable industrial units. To raise the sums needed for civil development, companies would have to be seen to be technically and financially sound. As the AIWP reported in April 1958:

“For reasons of history and because of the multiplicity of the military requirements which have hitherto been its main business, the aircraft industry at present consists of many units, most of which are too small and too weak to carry unaided the great costs and risks in the development of new aircraft.”¹⁴

The AIWP noted that some rationalisation had occurred already; but the aim was now to create no more than three airframe and two engine groups. It was hoped that the Airco consortium would lead to a full merger of de Havilland, Hunting and Fairey. Existing links between HSG and Bristol “may possess the seeds of further growth”. The growing ties between Vickers, English Electric and Short Bros also pointed the way to a strong balanced group. Helicopters could be swept up into a third airframe company. Rolls-Royce and Bristol Siddeley were obvious candidates to lead the two engine groups. However, it was felt that

encouraging the process further through contract manipulation alone may have reached its limits.¹⁵

The AIWP also noted that the Society of British Aircraft Constructors (SBAC) had lobbied for a continuation of government aid for civil programmes. According to the SBAC, while the government should accept the need to provide some support for the industry, especially given the continued requirement for military programmes and its role in promoting R&D, aviation must be part of a technology-led exporting strategy. The AIWP report concluded that “an efficient and profitable aircraft industry would be a good national investment; but the reverse would be a poor national investment”. Therefore, it recommended, the government should support a comprehensive civil R&D programme in the region of £200m, focusing on exceptional projects such as a supersonic transport (SST) or an advanced helicopter. However, this should still be dependent on industrial reorganisation, with industry encouraged to take over the expenditure required for future development.¹⁶

In 1958 the government’s annual spend on aeronautical basic research was running at £368m, although it was hoped that this would fall to £147m as the defence budget shrank. The government was also spending some £117–147m on civil development work, offset by £74m brought in from levies on civil programmes. With the full implementation of its private-venture policy for



ABOVE One of the UK's most ambitious aircraft research and development programmes at the time of the 1957 Defence White Paper was the Fairey Rotodyne, a compound helicopter conceived as a short- to medium-haul airliner capable of operating into and out of city centres. The sole prototype, XE521, first flew in November 1957.

the development of civil aircraft, the government expected to see the outgoing figure fall in time; but on contemporary estimates, there was a risk that continuing commitments to civil aircraft could still exceed £294m, absorbing nearly all the budget for other non-defence-related research. In the Treasury's view, this was hard to justify.¹⁷ Nevertheless, the government looked forward to a smooth transition from an aircraft industry overly dependent on government subsidy, either via the defence budget or through support for civil programmes, to a more self-sustaining group of companies.

The MoS, however, felt that the Treasury had failed to take account of the close links between civil and military research, and that the Treasury was really looking for a means to cancel or curtail activity, describing the Treasury's tactics as "divide and conquer", wanting to see a scramble between competing proposals so that "unnecessary" projects could be "brought to light for them to cancel".¹⁸

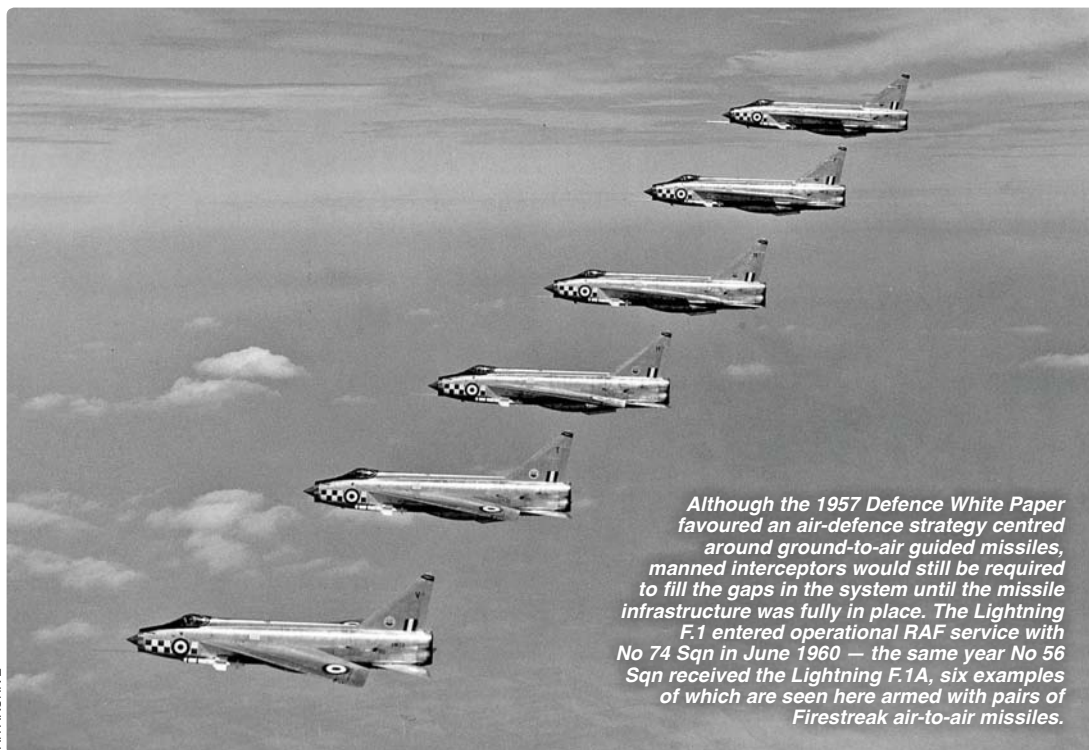
The AIWP report formed the basis for the government's first comprehensive statement on its post-1957 Defence White Paper strategy for the aircraft industry, delivered to Parliament on May 13, 1958. Minister of Supply Aubrey Jones's statement closely followed the arguments outlined in the AIWP report, and underlined the government's determination to create a self-sustaining industry. Jones told the House of

Commons that while the government would continue to support the industry generally in terms of R&D (again specifically mentioning civil supersonics and a large helicopter, the Rotodyne), the main thrust of policy was to encourage the emergence of financially larger and technologically stronger companies which could continue to finance their own civil programmes.

Despite the AIWP's growing doubts about contract manipulation as a means to force rationalisation, Jones reiterated that the primary approach would still be government control and/or influence over contract allocation. This, he said, was to be "something intermediate between full government authority and complete laissez-faire. What we need is a combination of impulse from above compelling the assumption of responsibility on the part of industry itself".¹⁹

POLICY BEGINS TO UNRAVEL

This policy of nudging industry towards the formation of stronger groups, backed by a modicum of support for advanced projects, quickly began to unravel. The government faced increasing criticism from industry, and even some elements within Whitehall. It was soon evident that officials in the MoS were pushing hard against the formal position of the government and Treasury. In November 1958 a Treasury member of the Transport Aircraft Requirements Committee (TARC) drafted an acerbic note reporting how



Although the 1957 Defence White Paper favoured an air-defence strategy centred around ground-to-air guided missiles, manned interceptors would still be required to fill the gaps in the system until the missile infrastructure was fully in place. The Lightning F.1 entered operational RAF service with No 74 Sqn in June 1960 — the same year No 56 Sqn received the Lightning F.1A, six examples of which are seen here armed with pairs of Firestreak air-to-air missiles.

the meeting “rapidly developed into an attack on the government’s recently announced policy of support for the aircraft industry.”

The note described how “the MoS made no attempt to defend the position taken by [its] minister set out in his statement to Parliament last May. The [TARC] Chairman restated the policy but made it clear that he thought this to be entirely misguided. An MoS official also referred to the AIWP and how it had fought hard, but with little success, to save the situation from a complete wreck. Not to be outdone, Tuttle from MoTCA gave an account of the attitude adopted by the Treasury in the Working Party. He said that the Treasury [was] not convinced that the best way to invest government money to promote exports was to support the aircraft industry, since [ceramic] pots earned as much in the export market as aircraft, and needed no R&D”. The note continued: “The BOAC man remarked that pots might go out of fashion; I thought it as well not to interject that they had been selling quite well for the past 7,000 years or so. I thought it better that I should not attempt a single-handed defence of the government’s policy. Since I was not invited to comment, therefore, I held my peace . . .”²⁰

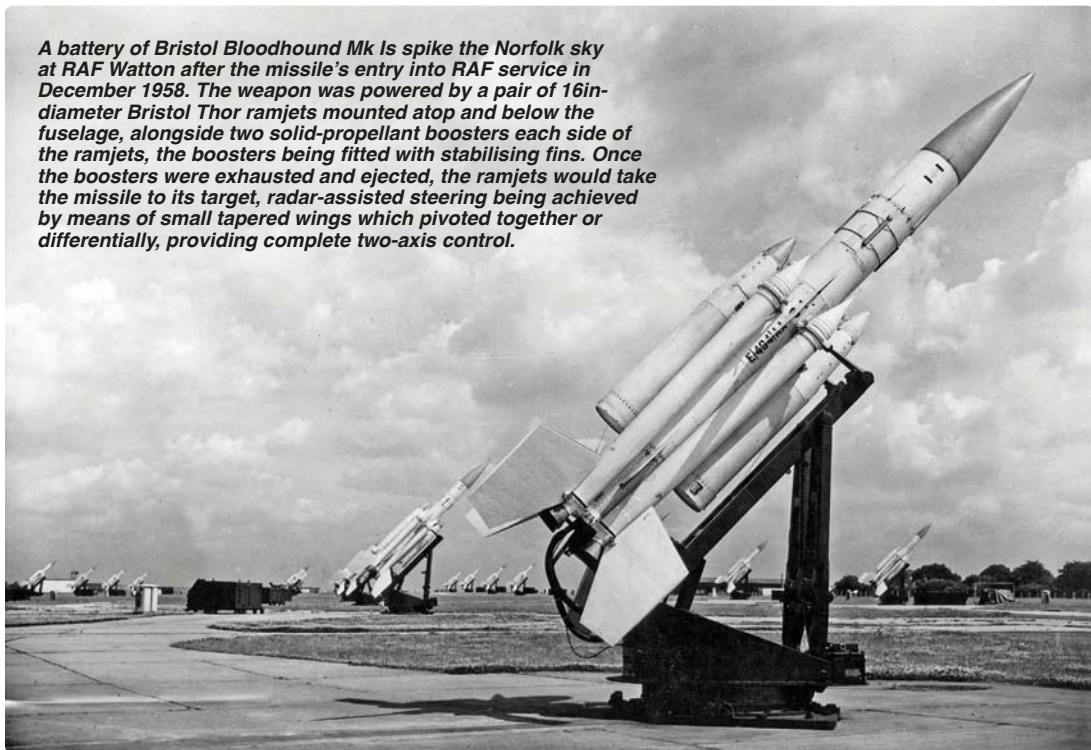
In December 1958, in the face of a growing crisis which had spread beyond the firms identified in July 1957, the Cabinet again reviewed the state of the aircraft industry, but now with a significant shift of policy in mind. Aubrey Jones reported that “the decline in employment over the last 12 months has been some 10,000 — less than the

average forecast. This may well mean that the decline to come will exceed the estimate and may amount to another 25,000 during 1959. I have the impression that companies which have been holding on [to] the chance that things might turn for the better are giving up hope and will soon break up their teams”.²¹

But HSG, Handley Page, Bristol and Short Bros still faced “possible collapse”; moreover, in the case of Vickers and de Havilland, with apparently enough work for the next five to seven years, all was “not well. There are signs that Vickers’ forthcoming civil project, the Vanguard, will not be a commercial success and the finances of the firm may as a result be rudely shaken; de Havilland is not only heavily dependent on the Blue Streak [medium-range ballistic missile] contract, but the commercial success of the Comet 4 also remains in doubt”. Two new military transports and OR.339, as well as possible further support for the Rotodyne, at least offered some respite.²²

The British aviation industry’s long-term future clearly depended on the civil sector. As the AIWP had reported, the future market for airliners appeared to be highly promising. However, the UK faced stiff competition from the USA, which had the advantage of a huge domestic market, and from countries like France, which viewed civil aircraft as “carriers of national prestige and influence; they therefore seek to promote civil aircraft as a deliberate matter of national policy”. Jones was ready to contemplate abandoning the private-venture policy for civil development that

A battery of Bristol Bloodhound Mk I's spike the Norfolk sky at RAF Watton after the missile's entry into RAF service in December 1958. The weapon was powered by a pair of 16in-diameter Bristol Thor ramjets mounted atop and below the fuselage, alongside two solid-propellant boosters each side of the ramjets, the boosters being fitted with stabilising fins. Once the boosters were exhausted and ejected, the ramjets would take the missile to its target, radar-assisted steering being achieved by means of small tapered wings which pivoted together or differentially, providing complete two-axis control.



the government had promoted since the early 1950s, stating: "It is desirable that there should be a return, at any rate in part, to the immediate post-war practice by which the government encouraged the development of chosen aircraft even though, on the inception of their development, there was no home requirement [i.e. firm commitment from a domestic airline]. It was under this system that the Viscount was produced. The opposite arrangement by which development is rarely started without a firm requirement encourages the customer to delay his requirement and, having delayed, to turn to an American aircraft which then happens to be coming along. We should, as far as possible, encourage manufacturers to undertake development with their own finances; but, with the depletion of revenues from defence contracts, few will have the resources to do this, and some government contribution is inevitable."²³

Some form of government support would break dependence on orders from the nationalised airlines, in which "the British aircraft industry is over-gearred to the demands of the home customers, small and uneconomic though they are, and [which are] often out of line with export demands". Jones concluded on a sombre note:

"Not only is the aircraft industry suffering on the combat side through the contraction of the defence budget, but it is also facing difficulties on the civil side. Indeed the basic facts are such that there may well over the next decade be an enforced withdrawal from the civil field, and with

it the disappearance of an important industry."²⁴

The Treasury was still reluctant to concede too much ground. Facing a request from Hawker Siddeley to support the 748 feederliner, an official wrote, "It is really quite absurd for Her Majesty's Government to contemplate offering any assistance for an aircraft of this description. If HSG cannot undertake a straightforward bread-and-butter project of this description without external assistance, any policy of progressively getting the aircraft industry to stand on its own feet is quite dead. We will plumb a new depth if we take on this one."²⁵ The government also faced a similar bid from Handley Page for support for a new version of the Herald.²⁶

SANDYS — AGAIN

With some historical symmetry, the agent of the new policy was not Aubrey Jones but Duncan Sandys, who assumed responsibility for the aircraft industry as the first Minister of Aviation, a post created in October 1959. He inherited a full-scale financial crisis at Vickers-Armstrongs' aircraft division, hitherto perceived to be one of the healthiest companies in the British aircraft industry, as well as growing demands from several industry and semi-official sources for support for "bread-and-butter" civil products.

Sandys moved rapidly to force the pace of rationalisation, actively engaging in the process through his "marriage bureau" and, in the case of the formation of the British Aircraft Corporation, taking part in the merger negotiations. As part of

the deal with industry, which included promises to focus public orders on what became two merged enterprises, BAC and Hawker Siddeley Aviation, he formally introduced launch aid, which provided support for civil projects in return for a levy on sales.²⁷

In 1962 the wheel turned full circle; in addition to the development of the TSR.2 to OR.339, the government agreed to a collaboration with the French to fund the development and production of an SST, which would later become Concorde. At the same time the government, in a final dismissal of the "all-missile" 1957 Defence White Paper, launched a new round of military aircraft developments, including the V/STOL supersonic Hawker Siddeley P.1154 and, later, a series of missile, helicopter and aircraft collaborations with France. Employment in the industry had fallen to just over 291,000 from nearly 312,000 in 1957, and several companies not included in the 1959–60 regrouping, including Handley Page, had disappeared or were fading away.

The value of industry output rose slightly from £7.3bn in 1957 to £7.6bn in 1960, reaching £8.2bn in 1962, but in any case the statistics would not have taken note of 1956–58 cancellations; and, by the early 1960s, launch aid and other investments had overtaken the cuts introduced by Sandys (ABOVE RIGHT) and the White Paper in 1957. However, hopes of export-led growth had faded somewhat, with the value of exports dropping from £2.4bn in 1958 to £1.6bn in 1962 (averaging about a quarter of the industry's total sales). Significant growth in both output and export revenues would not return until the mid-1960s.²⁸



By October 1964 all seemed set fair for a newly energised and still largely autonomous British aircraft industry. In one respect Sandys had done the industry a favour, by forcing productivity gains through the resulting job cuts. Although growth in the early 1960s would be increasingly linked to European partnerships, the core of future development was to be a new generation of indigenous military programmes. This confident new beginning was soon to be shattered by the Plowden Report, in retrospect arguably a far more significant milestone in the history of UK aerospace than the much-maligned 1957 Defence White Paper.

1 House of Commons Select Committee on Estimates, Session 1955–56, *The Supply of Military Aircraft*, HC34, para 115, HMSO, 1956

2 Cited in Hayward, Keith; *The British Aircraft Industry*, Manchester University Press, 1989, p68

3 Including the de Havilland Blue Streak ballistic missile, at a cost of £4.2bn. NB all financial data herewith are presented in 2017 values

4 Memorandum (Defence Programme) by the Minister of Supply, July 1, 1957; The National Archives (TNA) ref CAB/129/88

5 A reference to Hawker's V/STOL work (P.1127 et al)

6 TNA ref CAB/129/88, op cit

7 Ibid

8 Notes of Cabinet meeting, July 10, 1957. TNA ref AVIA65/1084

9 Ibid, First Report by the Aircraft Industry Working Party, April 18, 1958

10 Ibid

11 Ibid

12 Ibid

13 Ibid

14 Ibid

15 Ibid

16 Ibid

17 Ibid, Memoranda from Treasury to Ministry of Supply (MoS), June 5 and June 13, 1958

18 Ibid, MoS note, July 3, 1958

19 Hayward, Keith; *Government & British Civil Aerospace: A Case Study in Post-war Technology Policy*, Manchester University Press, 1983, pp30–31

20 Treasury note of TARC meeting, November 21, 1958, TNA ref T225/1635. A marginal comment adds: "Nicely put!" The TARC was an inter-ministerial committee, with participation from the RAF and nationalised airlines to discuss future transport aircraft requirements

21 Memorandum (The Aircraft Industry) by the Minister of Supply, December 18, 1958, TNA ref CAB/128/32

22 Ibid

23 Ibid

24 Ibid

25 Treasury note, February 3, 1959, TNA ref T225/1635

26 The Treasury's rearguard action soon failed, and both the 748 and Herald received support with the reintroduction of government aid for civil programmes in January 1960

27 See *Offers They Couldn't Refuse: Mergers in the British Aircraft Industry 1957–62*; *The Journal of Aeronautical History*, Royal Aeronautical Society, 2013. Launch aid, or as it is now officially described, Repayable Launch Investment, is still the primary vehicle for supporting UK civil aerospace products

28 Hayward, Keith; *The British Aircraft Industry*, op cit, Tables 9 and 10

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THE JOLLY ROGERS' CAPE YORK CATASTROPHE

In October 1942 the USAAF's newly-minted 90th Bombardment Group was flung into action in the South-west Pacific, despite being far from combat-ready. **BOB LIVINGSTONE** reveals how a combination of crew inexperience, poor planning and dreadful weather led to the worst possible start to the unit's operations from its primitive base in northern Queensland



The 90th BG moved from Key Field to Greenville, South Carolina, in June 1942, for training, before spending a few weeks at Willow Run, Michigan, where the unit's B-24Ds are seen here on their arrival on August 4 the same year. The 90th took its Ds into combat in the Pacific the following month.

ALL PHOTOGRAPHS VIA AUTHOR



BY THE END of 1944 the Consolidated B-24-equipped 90th Bombardment Group (Heavy) was probably the best-recognised and most successful bomb group in the USAAF's Fifth Air Force. The 90th BG's older olive-drab camouflaged aircraft had mostly been replaced with shiny new unpainted aircraft, the brightly painted fins of which, with their grinning skull-and-crossed-bombs insignia and red-white-and-blue-striped rudders, loudly and proudly proclaimed them to belong to "The Jolly Rogers, the Best Damned Heavy Bomb Group in the World!". It was not always like that, though.

In July 1942 Maj-Gen George C. Kenney's Fifth Air Force, headquartered in Brisbane, Australia, consisted of a ragtag collection of aircraft, mostly obsolete, the majority of which had escaped from the Philippines and Java. Heavy bomber types included the Boeing B-17E and F models and a small number of Consolidated LB-30s.

The 90th BG had been activated at Key Field, Mississippi, in April 1942 as part of the USAAF's post-Pearl Harbor expansion, but did not receive its first aircraft, with which to begin training, until late June. In August 1942 the unit spent two weeks at Willow Run, the sprawling Michigan factory and airfield where Henry Ford was building the B-24 under licence from Consolidated, and where the group continued to train and get to know its aircraft in intimate detail from the factory floor.

A crew had been lost in a training accident in June and another was lost while operating from Willow Run, the latter incident causing pioneer aviator Charles Lindbergh, at Willow Run at the time as an adviser to Ford, to write in his diary:

"I found the pilot had been out of flying school for only a few months and had less than 500hr total flying time; yet he was the captain of a four-

engined bomber and sent out through a stormy night to carry on a practice mission! What possible good can come from pushing men so fast? First, this B-24 squadron [sic] is organised of young and inexperienced officers; then it is ordered to be ready for the combat zone 'in one month', untrained, unequipped, and without having had a single round of 0.5in ammunition [with] which to train its gunners."

On August 23, 1942, the 90th was ordered to California to prepare for overseas movement; not to the European Theatre of Operations (ETO) as expected, but to the Pacific as the first B-24 heavy bomber unit for the Fifth Air Force, in time for the latter to go on the offensive. The first 12 bombers which the group would fly in combat were issued at the same time.

TO THE PACIFIC

The first of the Liberators departed for Hawaii on September 15, 1942, and the next group on the 19th, the latter losing an aircraft to engine problems with a subsequent ditching in San Francisco Bay. By October 10 all four of the group's squadrons — the 319th, 320th, 321st and 400th Bombardment Squadrons (BS) — were in Hawaii, dispersed across four separate airfields. It was during the group's Hawaiian stopover that trouble really began.

Major-General Willis H. Hale, commander of the Seventh Air Force, took the opportunity to transfer men from his command into the 90th. These were B-17 pilots who had been present on December 7, 1941, and who were being given the opportunity for promotion as squadron commanders, replacing three of those already in command. Hale gave an old friend, Col Roger M. Ramey, the job of Group Commander.

OPPOSITE PAGE *The nose of 400th BS B-24 serial 41-23831, one of the few in the 90th BG apparently not to sport a name, was amputated by squadron-mate Bombs to Nip On during the unit's disastrous night take-off from Iron Range on November 16, 1942. The aircraft was due to be the eighth in sequence to depart the remote airstrip.*



ABOVE One of the B-24s that narrowly avoided the disaster at Iron Range in November 1942, serial 41-11904, *Pride of the Yanks*, of the 400th BS, is seen here over Ward's Strip, Port Moresby, the following year, after being fitted with the nose-turret modification. The aircraft had managed to depart the airfield before the carnage began.

The Commanding General of the USAAF, Lt-Gen Henry H. "Hap" Arnold, chose this time to undertake an inspection tour of the South and South-west Pacific theatres, and members of his staff spoke with officers of the 90th. It seems that some of the former B-17 personnel were less than enthusiastic about the B-24 and the morale of the group was suffering. Arnold became concerned and wrote to Hale:

"This popular notion of the inferiority of the B-24 shall not be reflected in the personnel of the 90th Bombardment Group . . . the result might approach disaster if the 90th moves into Australia . . . with the general belief that [its] airplane is an inferior weapon.

"During my very brief visit . . . some members of your 90th Bombardment Group were expressing unfavourable comments about the B-24 . . . I do require quick and forceful action on your part to assure that they will not move into the battle with a preconceived erroneous belief that theirs is not a truly superior heavy bomber."

Before Hale received the letter he had, at Ramey's request (prompting speculation that it was Ramey himself who may have been the source of the discontent), transferred Ramey to Australia to take command of the 43rd BG, already in combat with the B-17. His replacement was Col Arthur W. Meehan, and Hale was (rather duplicitously) able to respond to Arnold that he had replaced group and squadron commanders.

The 90th BG squadrons began further training and flying long patrol and search missions in defence of the Hawaiian Islands, particularly

useful for navigation training, although one crew made a forced landing having run out of fuel by flying with a full-rich fuel setting. Some of these search missions were directed at looking for Capt Eddie Rickenbacker and his crew, who had been forced to ditch in the Central Pacific in a B-17D on October 21. Other replacement pilots were received, many fresh from flying school and some never even having flown in a B-24.

The 320th BS had a further command change after the CO got everybody up at 0200hr for "a final meal before they died", the CO being convinced they were all going to die "in that bucket of bolts". Deemed psychotic, the CO was replaced by Maj Raymond S. Morse, another B-17 pilot with no B-24 experience.

ON TO AUSTRALIA

The 90th's flight to Australia began with the departure of the 319th BS on October 19, 1942, followed by the 321st on October 26, the 400th on October 31 and the 320th on November 1. Major Morse, when approached by a squadron member to assist him with the loading of his gear, replied that all he had was a bottle of whiskey and a change of underwear because he "expected to die and didn't want anyone to have to send all his stuff back to Hawaii!"

The route taken from Hawaii was initially to Christmas Island, thence to Canton Island, Nandi Waters on Viti Levu (part of Fiji), Plaine des Gaiacs (New Caledonia) and finally on to RAAF Amberley, west of Brisbane, Queensland. Some aircraft varied the route slightly, in particular to



LEFT *Liberator 41-23942, Bombs to Nip On, of the 400th BS, at Iron Range in early November 1942, probably after a mission, as the navigator/bombardier takes the Norden bombsight from the aircraft to be locked away after landing. Within days Bombs to Nip On was to be at the centre of a major tragedy.*

BELOW *Originally destined to become a Liberator II for the RAF, AL626 is seen here at Iron Range in December 1942, after having been requisitioned by the USAAF as an LB-30 in the aftermath of Pearl Harbor. Note the proximity of the parking area to the packed-earth runway, leaving little room for error on take-off.*

avoid New Caledonia, as Maj-Gen M.F. Harmon, commander of the US Army in the South Pacific, was reported to be retaining aircraft passing through for his own uses until Washington intervened. Some aircraft were delayed by mechanical malfunctions, but all arrived safely.

At Amberley the B-24s' nosewheel anti-shimmy collars were replaced by locally manufactured items as all the originals and spares were cracked. The aircraft were serviced and necessary repairs made before the aircraft were on the move again to Hoevet Field, near Mareeba on the Atherton Tableland west of Cairns in northern Queensland. The 90th replaced the last remnants of the 19th and 7th BGs, which were being withdrawn to the USA as war-weary, and was to operate with the Mareeba-based B-17s of the 43rd BG, which had become operational in March 1942.

On the same day as the first 320th BS B-24s reached Mareeba, Gen Kenney wrote to Arnold:

"Another disturbing element is the state of training of the B-24 crews coming from Hawaii. I find that their night flying is not up to scratch. This job here calls for night take-offs with maximum loads and often with crosswinds, climbing through overcast to 15,000ft [4,500m] and sometimes 20,000ft [6,000m] to get on top in order to navigate. I'm trusting that the tactical situation, the weather and other factors give me a chance to nurse them along for a while before I have to push them too hard, because they are not ready to start pitching the day they arrive in Australia by a long way."

Mareeba was not to be the group's last stop, however. The 90th's ultimate destination was a recently-built field named Iron Range further north on the eastern side of the Cape York Peninsula in tropical Far Northern Queensland. Iron Range (now known as Lockhart River Airport) had two bare-dirt strips; Claudie Strip was 3,300ft (1,000m) long for smaller types, and the other, Gordon Strip, bearing 120°, was 7,000ft (2,100m) long and 100ft (30m) wide, cut into a 250ft (75m) clearing in the trees, which was able to take the B-24. Aircraft had to be parked along the side of the runway, tail facing the trees, their noses less than 6ft (2m) from the wingtip of a B-24 on the runway centreline.

Iron Range was the area deemed nearest to





ABOVE Liberator 41-23767, named Choset, participated in the 90th BG's first combat mission, a reconnaissance sortie over the eastern coast of New Guinea on November 11, 1942. It is seen here under camouflage netting with members of the 319th BS at Fenton, Northern Territory, in May 1943.

MAP BY MAGGIE NELSON



the front line while still being unlikely to be attacked by Japanese aircraft. Port Moresby on New Guinea was a much better location but the Imperial Japanese Army was only 30 miles (50km) away in September 1942 and it lay open to easy attack by enemy aircraft operating from bases on the northern side of the Owen Stanley mountain range. Also, "7-Mile Drome" (Jackson Airfield) for heavy bombers was still under construction.

"THE WORST AIRFIELD . . ."

Iron Range was described by 90th BG personnel as "probably the worst airfield the 90th ever flew out of. It was hewn out of jungle growth by hardy Australian engineering squads which chopped down trees and vines, blew out the stumps and levelled off the dusty topsoil for a runway and parking area for the 'planes. The runway was dirt — no asphalt or concrete covering. When those four large engines began to spin their propellers [sic], a Kansas-size dust storm resulted. The first 'plane off the field was the lucky one. Succeeding 'planes and their pilots had to guess that the nose of their 'plane was pointed down the runway. Zero visibility was the term used to describe the problems facing the pilot who followed in sequence from the first take-off."

Australian Flt Lt Alan Randall, who flew a No 36 Sqn RAAF DC-2 into Iron Range on November 20, 1942, en route to Port Moresby, recalled:

"From the air the place looked no more than a landing strip with a few men in control, but when shown around we were simply amazed



ABOVE & RIGHT Another early participant in the 90th BG's Pacific campaign was 41-23714 8-Ball of the 319th BS, which was attacked by Japanese fighters during a bombing raid on Bougainville on November 14, 1942. It was one of the aircraft able to depart on the mission after the accident at Iron Range in November.

at the magnitude of this American base. It was surrounded by a veritable jungle, with lianas hanging from the treetops like giant ropes and the gnarled and twisted trunks of the beech trees. In this maze lived 4,500 American troops, like little dwarfs in a wood, living as near to nature as a human being can.

"The shipping was a few miles north at Portland Roads and supplies were constantly being unloaded there. We noticed great stacks of cased goods sufficient to supply this Army and Air Force base for three months without outside assistance. All this activity was carried out under the cover of the jungle [which] was a wonderful camouflage [sic] to enemy aircraft."

Conditions for the personnel at Iron Range were extremely basic. The climate was hot and humid, accommodation comprised tents under the trees, the area was infested with snakes and various poisonous insects, the food was bland and repetitious, refrigeration non-existent, working conditions unpleasant and there was little or nothing to do outside duty time. The crews would have been completely unprepared for conditions such as these and it would have presented a major culture shock. Even today, Iron Range is an isolated location, with restricted access by anything other than aircraft.

The haste to put the B-24s into operations can be gauged by the fact that the first 90th BG B-24s arrived at Amberley on October 23 and on November 11, five 319th BS aircraft departed Iron Range to stage through Port Moresby for



the Group's first combat mission. This was a long-range reconnaissance mission to Wewak, Madang, the Vitiaz Strait, Finschhafen, Lae, Salamaua and Buna, flown by B-24s 41-23719, named *Hellzapoppin* and 41-23767, named *Chosef*. The weather was not conducive to positive results, however, and the full mission was not flown; no enemy aircraft were sighted and neither aircraft was damaged.

The same day the naval battle for Guadalcanal commenced, so on the 14th nine B-24s were in position at Port Moresby ready for an early morning bombing mission on the 15th to the Buin-Faisi area of Bougainville in the Solomon Islands. Specific records for the early days of the Pacific War are hard to find but an RAAF Form A.108(D) — Combat (Bomber) Report — exists for B-24 serial 41-23714, *8-Ball*, flown by Lt Clarence Eckert, which details the aircraft being attacked over Shortland Island by four single-engined fighters — three Nakajima A6M2-N *Rufe* floatplane fighters and one unidentified "double floatplane", probably an Aichi E13A *Jake* — without damage.

Another B-24, serial 41-23760 *Miss Beverly*, flown



ABOVE *Big Emma and friends: B-24 41-23751, seen here at Ward's Strip in June 1943, was the aircraft which precipitated the departure delays of the November 16 mission, and which lost its astrodome to Bombs to Nip On. On August 8, 1943, Big Emma encountered bad weather and crashed near Port Moresby, killing all aboard.*

by Lt John H. Werner, was hit by anti-aircraft artillery during an attack on shipping, holing the bomber's long-range tank in the bomb bay and damaging two engines, which subsequently failed. Tracking past Milne Bay in south-eastern New Guinea owing to weather conditions, the crew was forced to ditch near Baibara Island; only two men survived. Liberator 41-23718 *The Condor* was unable to transfer fuel and landed with its wheels up on Quintel Beach near Iron Range. Little or no damage was inflicted on the Japanese. It was not an auspicious beginning — but worse was to come.

CARNAGE AT IRON RANGE

Despite these losses, a mission was planned for late the following evening, November 16. Originally the mission was to be a repeat of that of the 15th to the Buin-Faisi area, but it was switched to a raid on Rabaul, direct from Iron Range. Rabaul was a heavily fortified Japanese naval and air base on New Britain, and was to be attacked many times by the USAAF without major success. General MacArthur's "island-hopping" campaign effectively neutralised and isolated the base later in the war and there were still 69,000 troops there when Japan surrendered, but no aircraft activity; the USAAF had achieved that much at least.

A total of 15 aircraft was detailed for the mission on November 16, the first scheduled to take off at 2300hr. Captain Robert S. Holt, the 320th BS's

Intelligence Officer, wrote in his Attack Report on November 19:

"[The] briefing commenced at 1800hr AEST [Australian Eastern Standard Time] and continued for various elements of the combat crews until shortly before [the] designated take-off time. Navigators, bombardiers, radio operators etc were briefed severally at different times and places. This resulted in inevitable delays in preparing the airplanes of the 320th for take-off. It had been necessary to install bomb-bay tanks in the airplanes, load bombs, service the 'planes and taxi them to suitable positions for take-off on the taxi strip along the runway; with only two maintenance men per airplane available, the non-availability of combat crews on the line during the major part of the evening militated against an orderly and thorough preparation of equipment for the mission."

Aircraft were positioned on the left-hand side of the runway (looking in the direction of take-off) in the nominated departure sequence as follows:

- No 1 serial 41-11902 *Punjab*;
- No 2 serial 41-23751 *Big Emma*;
- No 3 serial 41-11868 *Bucket of Bolts*;
- No 4 serial 41-23765;
- No 5 serial 41-23673 *Patches*;
- No 6 serial 41-23750 *Cowtown's Revenge*;
- No 7 serial 41-23759 *50 Cal Gal*;
- No 8 serial 41-23831;
- No 9 serial 41-11904 *Pride of the Yanks*;
- No 10 serial 41-23720 *Tear-Ass (The Bull)*;



ABOVE Details of the nose art on four of the aircraft involved in the catastrophe; *Pride of the Yanks* (41-11904) and 41-23720 *Tear-Ass (The Bull)* both got away before 41-23942 *Bombs to Nip On* lost control. *Hellzapoppin* was named after the 1941 *Ole Olsen* and *Chic Johnson* movie, as its regular pilots were called *Olsen* and *Johnson*.

No 11 serial 41-23942 *Bombs To Nip On*;
 No 12 serial 41-23719 *Hellzapoppin*;
 No 13 serial 41-23714 *8-Ball*;
 No 14 serial 41-23731 *Dirty Gertie*;
 No 15 serial 41-23709.

Parked between *Pride of the Yanks* and *Tear-Ass (The Bull)* was B-17F serial 41-24522 of the 43rd BG. It is estimated that these 16 aircraft would have extended alongside the runway to almost the 2,500ft (760m) mark. The weather was a low overcast with drizzle and very dark.

Leading the mission in aircraft No 1, *Punjab*, were 320th BS CO Maj Morse and Group Commander Col Meehan. The aircraft was started, taxied and departed on time at 2300hr. The second B-24, *Big Emma*, captained by Lt Iverson, had started to taxi out but was unable to continue because the port bomb-bay door would not close as it was fouling the recently installed bomb-bay tank. *Big Emma* thus further infringed the runway, forcing following aircraft to backtrack on the runway west of the centreline. The 320th BS Intelligence Officer's Attack Report continued:

"Substantial confusion existed [after the first departure] due to the fact that certain airplanes with assigned numbers in order of take-off were not ready; no method of communication on the line had been worked out, no method of control in despatching was arranged. Hence pilots did not know whether to taxi out on to the runway or not. The first airplane took off with landing lights; those that followed did not, and accordingly came

dangerously close to the airplane[s] parked along the taxi strip on [the] east side of [the] runway. Runway lights were placed too far apart, leaving inadequate space between the east string [which the pilots had inevitably to follow owing to their position in the cockpit] and the airplanes parked on the taxi strip."

This all took time to sort out, and No 9, *Pride of the Yanks*, was next for departure, getting airborne at 2314hr, followed by No 10, *Tear-Ass (The Bull)*, at 2318hr. With the whole sequence now shot to hell, and people running about in the dark and drizzle with aircraft engines running, it was getting dangerous; tempers flared, aircraft captains became impatient and chaos ruled.

Next away was No 6, *Cowtown's Revenge*, flown by Lt Whitlock, followed by No 5, Lt McWilliams in *Patches*; No 7, Lt Campbell in *50 Cal Gal* was next, followed by No 3, Lt Andrews in *Bucket of Bolts* at 2350hr. Lieutenant Larson in No 11, *Bombs to Nip On*, was lined up and ready to roll just after midnight. By this time the mission was running well behind schedule, and there were still three B-24s and the B-17 parked on the taxiway beside the first 1,500ft (460m) of the runway. Larson advanced the throttles and the aircraft began to move down the runway.

The crew of the aborted *Big Emma*, standing beside the aircraft watching the departures, noticed that *Bombs to Nip On* was not running true and scattered. *Bombs to Nip On*'s port wing passed over the nose of *Big Emma* and swiped the



ABOVE *Crunch! The force with which Bombs to Nip On went careering through the flight line is evident from this photograph of 41-23765, another apparently nameless machine, the day after the incident. Second to be struck by the out-of-control Bombs to Nip On, '765 lost its glazed nose and a sizeable portion of the port forward fuselage.*

astrodome and pitot tubes clean off. Continuing to the left, *Bombs to Nip On's* wing next hit No 4, 41-23765, smashing through the nose, taking off the "greenhouse", bending the metal and tearing off a large chunk of the port side of the nose.

By now completely out of control, *Bombs to Nip On* careered on and crashed into the cockpit of No 8, 41-23831, ripping the nose off altogether. The force of this final impact spun *Bombs to Nip On* into a groundloop through the position of the departed No 9, and its starboard wing tore off the tail of the B-17, gutting the latter's fuselage like a fish, after which the dying B-24 cartwheeled into the scrub on fire. Miraculously, the Intelligence Officer, Capt Holt, was thrown out of the bomb bay where he had been standing for the take-off and suffered only minor injuries, but the remainder of the crew were trapped and killed in the explosions of the bomb load.

Despite the carnage, three of the remaining four 319th BS aircraft parked down the line from the accident managed to depart on the mission after midnight. The nearest B-24 to the B-17, *Hellzapoppin*, no doubt suffered some damage from flying debris. It is known that one aircraft, probably this one, had its tail replaced with that from *The Condor*, which had forced-landed on Quintel Beach on the 15th.

It is difficult to imagine just what the feelings of those men must have been as they taxied out

and took off. The death toll from the accident was 11 men aboard *Bombs to Nip On* and a guard in the nose of 41-23831. No specific cause for the accident was ever determined, but it was no doubt a combination of circumstances including inexperience, insufficient training, the shambles of the departure sequence, pilot error, mechanical failure, weather, darkness, poor runway lighting, the slippery wet dirt runway, morale and other factors. It was even surmised that one or both of *Bombs to Nip On's* port engines had failed.

The rest of the mission was hardly a success either, as the 320th BS's Attack Report states:

"The three airplanes of the 320th that are known to have reached the target appear to have spent sufficient time over the area, under cloud conditions unfavourable for bombing, to justify the belief that their runs, when made, were carefully planned and timed and that hits or near-misses on their several objectives were scored."

This was not the end, however. Of the ten aircraft that departed, only nine returned. *Punjab*, carrying both the Group CO and the 320th BS CO and ten other crewmen, simply vanished; Morse's premonition of October 19 had come to pass. To this day nothing has ever been heard of them. The cost of this ineffective mission was 24 men, four B-24s and one B-17. In the two-month period (September 19–November 17, 1942) since the 90th had left the USA and flown just three

90TH BG B-24 "BOMBS TO NIP ON" ACCIDENT, IRON RANGE, QUEENSLAND, NOVEMBER 16, 1942

B-24 serial 41-23942 Bombs to Nip On's take-off path

Bombs to Nip On veers towards parked aircraft. Wing passes over nose of 41-23751 Big Emma, smashing astrodome and pitot tubes

Wing smashes through nose of 41-23765

Take-off direction

Bombs to Nip On hits and tears off nose of 41-23831

Bombs to Nip On groundloops, destroys rear of B-17F serial 41-24522. Burning wreckage of Bombs to Nip On comes to a halt in the scrub

Bombs to Nip On taxis down runway towards take-off position just after midnight

Runway lights placed too far over and encroach on taxiway, forcing B-24s to use runway to taxi to take-off point

PLANNED DEPARTURE SEQUENCE

- 1 41-11902, Punjab (pilot Morse)
First to take off; airborne on schedule at 2300hr
- 2 41-23751, Big Emma (Iverson)
Second to depart; taxis forward but unable to proceed; aborted
- 3 41-11868, Bucket of Bolts, (Andrews); seventh aircraft to take off; airborne at 2350hr
- 4 41-23765 (Adams)
Substantially damaged. Repaired
- 5 41-23673, Patches (McWilliams)
Fifth aircraft to take off
- 6 41-23750, Cowtown's Revenge (Whitlock); fourth aircraft to take off
- 7 41-23759, 50 Cal Gal (Campbell)
Sixth aircraft to take off
- 8 41-23831 (pilot unknown)
Written off
- 9 41-11904, Pride of the Yanks (Coolidge); second aircraft to take off. Airborne at 2314hr
- Boeing B-17F serial 41-24522
Destroyed
- 10 41-23720, Tear-Ass (The Bull) (Wilson); third aircraft to take off; airborne at 2318hr
- 11 41-23942, Bombs To Nip On (Larson); eighth aircraft to depart
- 12 41-23719, Hellzapoppin (Olsen)
Damaged by debris; did not depart
- 13 41-23714, 8-Ball (pilot unknown)
Departed after accident
- 14 41-23731, Dirty Gertie (Jones)
Departed after accident
- 15 41-23709 (Robertson)
Departed after accident



ABOVE LEFT Blackened tree stumps and scattered debris mark the spot where Bombs to Nip On finally came to rest. All aboard, except Intelligence Officer Capt Holt, who was thrown clear, were killed.

ABOVE The mangled nose of 41-23765 the morning after the accident. Initially written off as unrepairable, the Liberator was reassessed in light of the type's scarcity in theatre . . .

LEFT . . . and a rudimentary but effective wood-and-fabric nose was constructed and attached by a pair of Australian engineers. The aircraft was then flown to Brisbane for extensive repair work.

BELOW In contrast, sister aircraft 41-23831 was so badly damaged, with almost the entire forward fuselage sliced off, that it could only be scrapped for spares at Iron Range. Some small consolation was that the crew was not aboard at the time, owing to the confusion of the poorly planned take-off; but a soldier guarding it was killed.





ABOVE Live to fight another day; after 41-23765 was flown with its makeshift wooden nose to Brisbane for repair, it was decided to fit a Consolidated tail turret in its place, and it is seen here at Archerfield, near Brisbane, on March 3, 1943, with the new turret in place and bearing its new name, Connell's Special, on the port fuselage.

combat missions, it had suffered 34 casualties and lost seven aircraft, not including two crews and aircraft lost earlier in training. It was a long climb up from this low point to become one of the Far East Air Force's premier heavy bomb groups two years later.

Author Steve Birdsall, in *Flying Buccaneers: The Illustrated Story of Kenney's Fifth Air Force* (David & Charles, 1979), states that "Kenney ordered the 90th taken out of combat and given additional training". Colonel Ralph "Zipper" Koon took command of the group and operations continued.

A UNIQUE REPRIEVE

At least there was one positive outcome from Larson's accident. Unnamed B-24D 41-23765, No 4 in the sequence and the second to be struck by *Bombs to Nip On's* wing, which was immediately deemed a write-off and from which various parts had been stripped, was given a reprieve. Liberators were rare and valuable weapons at this early point of the Pacific War, and a reassessment was made that it was repairable. Accordingly, two Australian civilian engineers were flown up from Brisbane and grafted an 8ft (2.4m) wooden nose section on to the B-24 and covered it with fabric. This was sufficient for the aircraft to be flown down to Brisbane, where a proper repair could take place.

The B-24 was known to be defensively weak against a head-on attack, a tactic quickly learned by Japanese pilots when the type entered combat. A cannon attack from directly ahead could kill everyone forward of the B-24's waist, and consideration was being given in the USA to various methods of adding forward firepower, including a remote chin-type turret installation as adopted on the B-17F onward.

Colonel Art Rogers, Deputy Group Commander

and Group Operations Officer, in company with Col Marion D. Unruh, Group Engineering Officer, had been agitating for the addition of a power-operated turret in the nose of the Liberator since their time at Willow Run. Unruh, later to be the 307th BG's CO, was transferred to the Seventh Air Force during the 90th's stay in Hawaii so as to drive the idea, using the facilities of the Hawaiian Air Depot (HAD). A prototype (41-23657) had been constructed in Hawaii with a modified B-24 tail turret in the nose position, but it was lost on its first combat mission on December 28, 1942, and the project had lapsed.

Rogers, who had brought HAD drawings of the modification with him from Hawaii, persuaded Kenney to permit the rebuild of 41-23765 to be modified to take a Consolidated tail turret in the nose. This was duly completed and the aircraft was named *Connell's Special* after Brig-Gen Carl Connell, the CO of the Air Service Command in Brisbane, whose enthusiasm for the project saw it through. *Connell's Special* returned to the 90th BG at Ward's Strip, Port Moresby, in March 1943 as Rogers's personal aircraft and the first nose-turreted B-24 in the South West Pacific Area, and it kick-started the modification of all combat B-24s passing through Hawaii, including many "secondhand" Seventh and Thirteenth Air Force aircraft requiring deep servicing. Rogers went on to become the Group CO in July 1943 and initiated the "Jolly Rogers" name ("pillaging vessels on the high seas") and insignia which did a lot to raise the morale, élan and pride in the group for the remainder of the war.



ACKNOWLEDGMENTS The author would like to thank Peter Johnston, whose detailed analysis of the planned and actual departure sequence during the incident was invaluable during the preparation of this article



LEFT Brian Turpin in the right-hand seat of a 748 during his tenure with Skyways Coach-Air in the mid-1960s. The author's recollections of flying the Douglas DC-3 for the airline formed the first part of this series — *Out On A Lymgne* — in TAH17.

BELOW The first production 748 Series 1, G-ARMV, is framed by the distinctive white picket fence and well-manicured hedges at Lymgne. "Mike Victor" made its first flight at Woodford on August 31, 1961, and undertook a sales tour of Jordan and Syria before beginning scheduled services with Skyways in April 1962. TAH ARCHIVE

In the second part of his series on flying for British independent airline Skyways Coach-Air in the 1960s, we join **BRIAN TURPIN** in the cockpit of the Hawker Siddeley 748, the state-of-the-art turboprop with which the company supplemented its fleet of ageing DC-3s on its routes to France and other European destinations from 1962 — it was to be "a fantastic leap forward . . ."

IN FEBRUARY 1966, after a few weeks spent flying the Douglas DC-3 on the line for Skyways Coach-Air (see *Out On A Lymgne* in TAH17), I was sent for a conversion course on to the Hawker Siddeley 748 at the company's factory at Woodford, near Manchester, at the time still known as the Avro Whitworth Division. Attending a proper technical course on a new aeroplane was a new experience for me as I had previously simply been shown round a new aircraft type by an old hand and then given a list of questions and answers which I was expected to learn for the Air Registration Board exam.

At Woodford we were given lectures on all the 748's systems and shown the new aircraft being assembled on the production line. We also received comprehensive technical notes covering all aspects of the aircraft, plus the inevitable list of questions and answers. A close association had built up between Skyways and Avro in recent years as the former had been lead customer for the 748. The company had received its first aircraft, G-ARMV, in late 1961, followed by two more — G-ARMW and G-ARMX — during 1962–63, all fitted out in a 48-seat configuration. The first aircraft had been written off in a non-fatal landing accident at Lymgne in July 1965 (see pages 46–47), but the fleet was expanded in the autumn of 1966 with the addition of two aircraft



FURTHER OUT ON A LYMPNE



FLYING FOR SKYWAYS COACH-AIR, 1966-71
PART TWO THE THOROUGHLY MODERN 748



In April 1963 Skyways Coach-Air took delivery of its third 748 Series 1, G-ARMX, seen here at Heathrow in March 1968. With the 748s joining the line on passenger services to the Continent from the spring of 1962, several of the airline's DC-3s were converted into freighters for the Lympne—Beauvais cargo service.

CHRIS KNOTT COLLECTION / AIRPHOTOGRAPHICINTERNATIONAL.COM



RIGHT Although passengers boarded the 748 using the port rear door, the type also incorporated an extremely useful freight door, measuring some 4ft 6in (1.37m) high and 4ft (1.22m) wide, on the port side of the forward fuselage. Here a Conveyancer-Scott electric tractor delivers a somewhat meagre load to a Skyways 748 at a travel fair at Biggin Hill.

from BKS (G-ARRW & G-ASPL) and in 1968 another, G-ATMI, was acquired from Autair.

By the beginning of March 1966 I was back at Lympne and on the 17th began my flight training. As far as I was concerned the 748 was a fantastic leap forward; a brand new aeroplane full of up-to-date systems and powered by turboprop engines. From a pilot's point of view, the thing which struck me first was the spacious cockpit, the large windows and the excellent way in which the controls were laid out, with the instruments and switches grouped together logically according to their functions and the systems they served.

GETTING STARTED

The usual arrangement of primary flight instruments for the captain and copilot were of a somewhat more modern vintage than those of my recent acquaintance, and included gyro compasses and radio magnetic indicators (RMIs) in place of the old directional gyros and relative-bearing indicators. Above the centre panel, adjacent to the window coaming, was the emergency panel which contained the controls for the engine fire extinguishers, propeller-feathering pumps and various warning lights for the engines and electrical systems.

At the top of each flight instrument panel were three vitally important propeller warning lights. In common with most turboprops of the day, the Rolls-Royce Dart's Rotol propellers had the complication of two "fine-pitch stops". One



GRAHAM LEWIS COLLECTION / TAH ARCHIVE

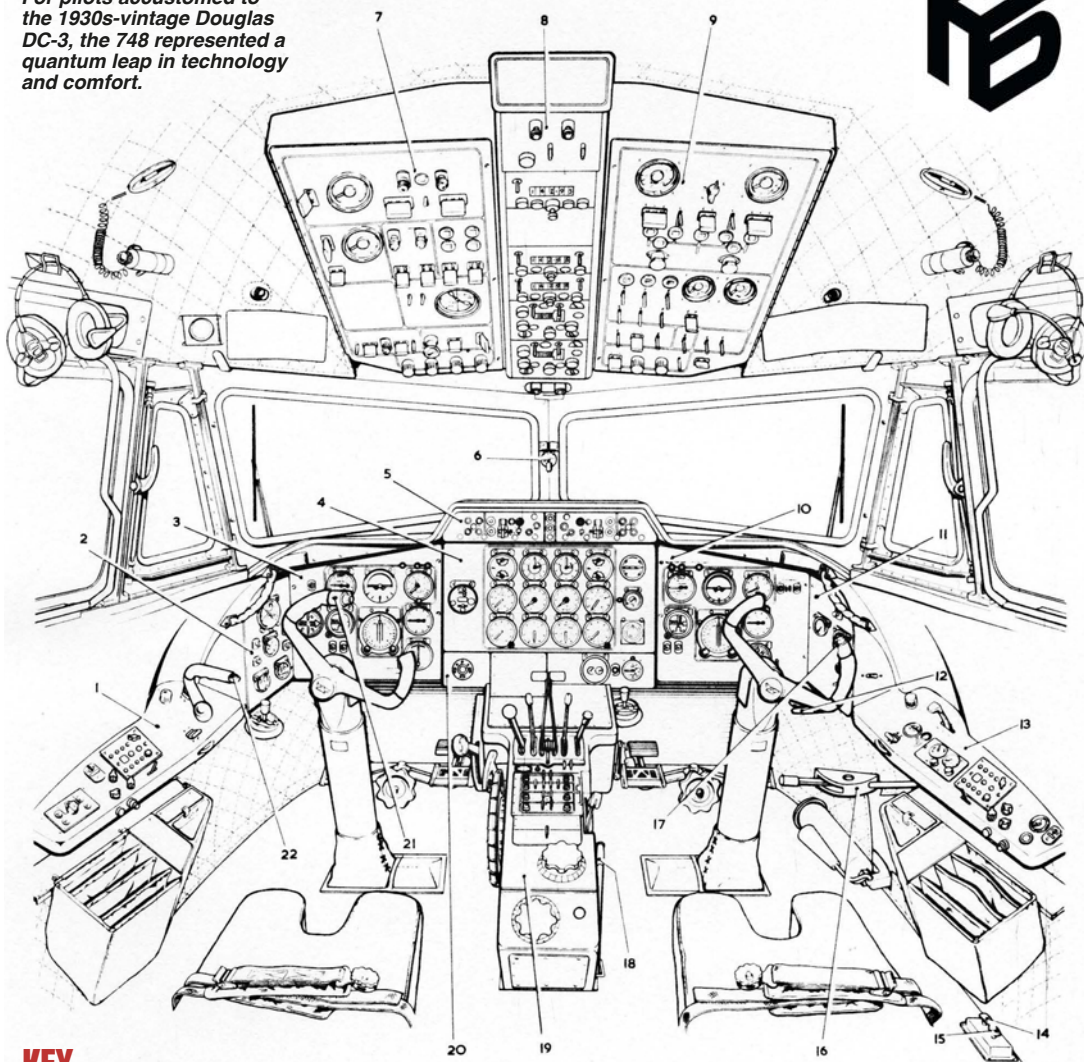
was the GROUND FINE stop (0° of pitch) for engine starting and ground operations; the other was the FLIGHT FINE stop (18½°), which could be withdrawn hydraulically but was always engaged during flight. The reason for the latter stop was to guard against the unlikely event of a malfunction in flight allowing the propeller to run to the GROUND FINE position. This would have had a similar effect to bolting a flat disc of the same diameter as the propeller to the front of the engine. The asymmetric drag effect so generated would be uncontrollable.

The FLIGHT FINE pitch-stops were withdrawn by means of a lever on the central control pedestal. Unfortunately, the solution to the perceived problem produced its own dangers if mishandled, although as far as I know no Rotol propeller on a Dart ever malfunctioned in this way.

The centre instrument panel contained the main instruments for the two Dart R.Da.6s (Mk 514s), and in addition to the usual r.p.m.

AVRO/HAWKER SIDDELEY 748 SERIES 1 CREW COMPARTMENT INSTRUMENTS AND CONTROLS

For pilots accustomed to the 1930s-vintage Douglas DC-3, the 748 represented a quantum leap in technology and comfort.



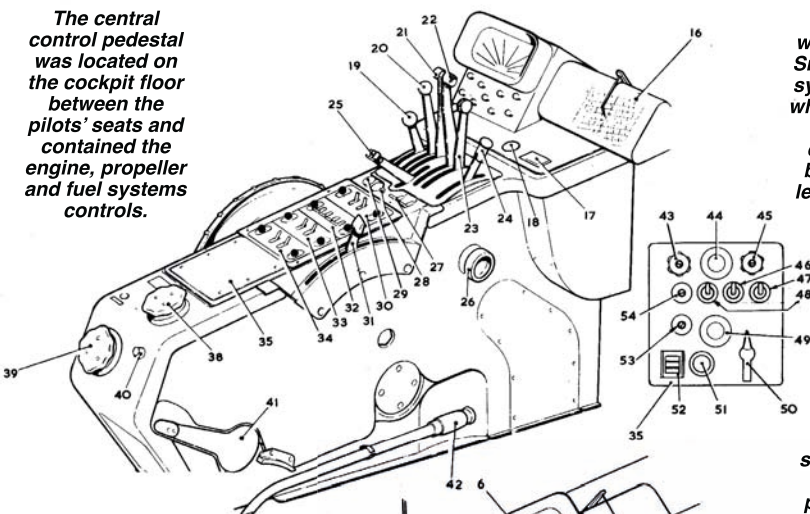
KEY

- | | |
|-------------------------------------|---|
| 1 Port console | 12 Undercarriage emergency lowering handle |
| 2 Port side panel | 13 Starboard console |
| 3 First pilot's panel | 14 Reverse-current contactor manual control |
| 4 Centre instrument panel | 15 Ditching handle |
| 5 Emergency panel | 16 Dump-valve lever |
| 6 Standby compass | 17 Second pilot's intercom & R/T switch |
| 7 Port roof panel (electrical) | 18 Emergency hydraulic hand pump |
| 8 Central roof panel (radio) | 19 Central control pedestal |
| 9 Starboard roof panel (electrical) | 20 Lower central instrument panel |
| 10 Second pilot's panel | 21 First pilot's intercom & R/T switch |
| 11 Starboard side panel | 22 Press-to-talk switch |

Source Avro/Hawker Siddeley 748 Training Manual, 1964

AVRO/HAWKER SIDDELEY 748 SERIES 1 CENTRAL CONTROL PEDESTAL

The central control pedestal was located on the cockpit floor between the pilots' seats and contained the engine, propeller and fuel systems controls.



The Skyways 748s were equipped with the Smiths S.E.P.2 autopilot system, the controls for which were incorporated into a panel on the central pedestal. The box illustration below left shows the autopilot control panel.

An Ekco weather radar system was incorporated between the central pedestal and the bottom of the instrument panel, the controls for which may be seen in the box bottom left, which relate to Nos 6-15 in the key.

KEY

- 1 Fuel crossfeed lever
- 2 Elevator trimwheel
- 3 Parking brake handle
- 4 Undercarriage selector lever
- 5 Undercarriage position indicator
- 6 Weather radar system indicator (Ekco)
- 7 Control panel
- 8 Power switch
- 9 Plastick lighting system
- 10 Time base range switch
- 11 Contrast control
- 12 Tilt control
- 13 Manual gain control
- 14 Function switch
- 15 Marker brilliance
- 16 Flight log (Decca)
- 17 Fuel datum calculator
- 18 Outside air temperature indicator
- 19 Propeller brake lever
- 20 HP cock lever
- 21 Throttle
- 22 Throttle
- 23 HP cock lever
- 24 Flying controls lock lever
- 25 Fine pitch stop lever
- 26 Damper knob
- 27 Fuel datum switches
- 28 Horn cancel button
- 29 Fuel datum indicators
- 30 Water methanol controls
- 31 Flap lever
- 32 Fuel pumps controls
- 33 Fuel heater controls
- 34 Engine relight controls
- 35 Autopilot Type 2C control panel
- 36 Autopilot master switches

autopilot panel (35)

- 37 Oxygen indication for supernumerary crew member
- 38 Rudder trim
- 39 Aileron trim
- 40 Console dimmer switch
- 41 Water methanol crossfeed lever
- 42 Emergency hydraulics handpump
- 43 Height control switch
- 44 Autopilot engage push button
- 45 Power supply switch
- 46 Elevator channel engage/disengage switch
- 47 Aileron channel engage/disengage switch
- 48 Rudder channel engage/disengage switch
- 49 Alter heading push button
- 50 Turn control knob
- 51 Dimmer switch
- 52 Pitch control switch
- 53 Beam control switch
- 54 Glide control switch

Source Avro/Hawker Siddeley 748 Training Manual, 1964



ABOVE The prototype 748, G-APZV, has its engines run up during its early trials programme. The aircraft made its maiden flight on June 24, 1960, from Woodford in the hands of Avro chief test pilot Jimmy Harrison, marking the manufacturer's bold decision to re-enter the civil market after decades of producing exclusively military aircraft.

indicators and fuel and oil gauges they included such new-fangled novelties as jetpipe temperature (JPT) gauges, fuel-flow indicators and torque-pressure gauges. There was also a switch for automatic engine synchronisation. The port and starboard overhead panels contained the switches for the DC and AC electrical systems, airframe de-icing (pneumatic), engine and propeller de-icing systems (electrical), engine-start switches and so on. The central overhead panel contained all the radio communication and navigation sets: two multi-channel VHF and a combination of either one VOR and two ADFs or vice versa.

At the top of the central control pedestal were the two throttle levers, high-pressure (HP) fuel cocks, left prop brake and flying-control lock lever. Behind the throttles was the vitally important FLIGHT FINE pitch-stop lever. The rest of the top surface of the pedestal carried a series of electrical switches for the water methanol, fuel booster pumps, fuel heat and engine relight controls. Essentially, if all these switches were in the forward position the aircraft was set for take-off. Behind these switches was the autopilot control panel. On the port-side face of the pedestal were the undercarriage selector lever, parking brake, elevator trimwheel and fuel crossfeed lever. On the starboard side were

the flap-selector lever, water methanol crossfeed lever, and, at the bottom close to the floor, the emergency hydraulic hand-pump. On the aft face of the pedestal were the trimwheels for the aileron and rudder.

INTO THE JET (-PROP) AGE

One of the great advantages of turboprop engines was their simplicity of control and operation, compared with the old supercharged piston engines they replaced. Instead of the central pedestal being festooned with levers to operate the throttles, propeller pitch and mixture controls, there were just two levers for each engine; one being the throttle and the other the HP fuel cock. Advancing the throttles controlled the settings of the automatic fuel-control units and through them the power developed by the engines. The propellers looked after themselves through their own control units, which varied the prop-pitch according to the power setting and the particular phase of flight.

The fuel system was similarly simple, controlled through the HP cocks backed up by electrically-operated low-pressure (LP) cocks which normally remained open except during certain emergency procedures. Opening the HP cocks effectively turned the fuel on, the port wing fuel tank supplying the port engine,



ABOVE *The 748's standard airline configuration accommodated 40–62 passengers in paired seats either side of the central gangway. The crew would usually comprise two officers on the flightdeck plus one cabin attendant. Like its larger turboprop-powered contemporary, the four-engined Vickers Viscount, the 748 boasted generously-proportioned oval windows.*

the starboard wing tank the starboard engine. There were no other separate tank selectors. The crossfeed lever allowed either wing tank to feed any engine if required. It was as simple as that. Each tank had a capacity of 570 Imp gal and could be filled either through overwing gravity filling points or underwing pressure refuelling/defuelling couplings, one for each wing.

Before the engines could be started it was necessary to set the fuel datum to prevent a “hot start”; if the fuel is ignited before sufficient air is flowing around the combustion chamber, the temperature will increase dramatically and exceed the design limits of the chamber and turbine blades, thus potentially causing severe damage. Two switches on the central pedestal were used to set the datum on two adjacent gauges, these being set to 100 per cent if the outside air temperature (OAT) was below 15°C (59°F) and to 50 per cent if above. The actual percentage setting for take-off was determined by means of a small fuel datum calculator fitted to the central instrument panel.

The starter selector switch was then set to either the No 1 or No 2 engine, the start master switch to START and the start button pressed until the engine began to turn over. The electric starter would then spin up the engine, and as the speed of rotation went above 1,200 r.p.m. the HP fuel cock was opened. According to Rolls-Royce this was all that was required but in reality, unless the HP cocks were used to control the jetpipe temperatures, a very hot start would result. This was particularly true if an internal battery start was made. Careful use of the HP cock was required to avoid the temperature exceeding the maximum of 640°C (1,184°F) until the engine was up to idle speed of 6,500–

7,500 r.p.m. and the temperature had stabilised. Many a good Dart engine was burnt out as a result of inexperienced hands following the manufacture’s starting instructions.

TO THE RUNWAY

Taxying was easy in the 748, the tricycle undercarriage providing good forward vision. The hydraulically-powered steering was effective and easily controlled through the twin nosewheels. Only the left-hand seat had a steering tiller, so the handling pilot did all the taxiing while the non-handling pilot worked through the checklist preparing the aircraft for take-off and working the radio to get airways clearances and so on. Right up until the summer of 1968 Skyways First Officers always flew the aircraft from the left-hand seat when they were handling pilot, as we did with the DC-3. Then we acquired a new chief pilot and a training captain from BOAC and that was the end of that, the end result being a lot of frustrated and demoralised First Officers.

The engines were started and idled with the props in the GROUND FINE position, in which the pitch of the propeller blades was zero, so that no thrust was produced and there was less load on the starter motor. To get the aircraft to taxi the throttles had to be advanced slowly, causing the pitch of the big four-bladed propellers to increase until the aircraft began to



Skyways Coach-Air 748 G-ARMX trudges across the grass in front of the control tower at Lympne before another flight to the Continent. The type was more than able to cope with the lack of a concrete runway at Lympne, although incidences of a 748 getting bogged down in mud after heavy rain were all too common.

RIGHT In contrast to the ubiquitous but ageing piston-engined DC-3, the 748 offered “all mod cons” for the pilot. British weekly magazine *Flight*’s regular aircraft reviewer Mark Lambert described the type as “purely a pilot’s aircraft . . . as easy to fly, though naturally not quite so sprightly, as a light twin, and as viceless as the best of them despite its 95ft wing span”.

move forward. Once under way, power could be reduced slightly to keep the aircraft moving at a steady pace. Throttle movement was mechanically restricted to no more than 10,400 r.p.m. with the control locks in, to prevent the FLIGHT FINE pitch locks from engaging, which would lead to “over-tempering” of the engines at slow speed. It also prevented attempts by absent-minded aircrew from taking off with the control locks engaged (and I have known some to try).

The pre-flight checks were straightforward. The big electrically-operated Fowler flaps were set for take-off at either 7½° or 15°, according to the performance requirements. Flying control trimmers were set to neutral; booster pumps ON, fuel heat to AUTO, engine and windscreen heat as required and pitot heaters ON. Water methanol was not normally used, but if needed for performance reasons it was switched on and the engines would use it as required once the throttles were advanced above 14,000 r.p.m. The control locks were then removed and the controls checked for full and free movement.

With the checks complete, the aircraft was lined up on the runway and the throttles were advanced smoothly, the pilot keeping an eye on the JPTs so as to avoid over-tempering. As the throttles were moved to the fully open position, the FLIGHT FINE lever would also move forward automatically. This engaged the propeller FLIGHT FINE pitch locks and



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prevented a propeller running to fully fine as a result of an engine failure or propeller malfunction at an inappropriate moment.

The propeller auto-feathering system became operational above 11,500 r.p.m. Full power was 14,500 r.p.m., at which point all the prop-related warning lights were checked to be out. Maximum allowed JPTs at take-off power were 595°C (1,103°F) dry (without water methanol boost) or 600°C (1,112°F) wet (with).

Owing to the 748’s exceptional short-field



ABOVE An early photograph of G-ARMV in flight, before the “Skyways Coach-Air” logo was applied on the fuselage above the windows. The 748’s flying controls were manual, with geared tabs on the elevator and ailerons plus a spring tab on the rudder. A hydraulic system operated the undercarriage, brakes and nosewheel steering.

performance, the gap between V_1 (take-off decision speed) and V_2 (minimum safe climb-away speed on one engine) was very narrow, just a matter of a few knots. Typical figures at a take-off weight of 34,000lb (15,420kg), using 15° of flap, would be a V_1 of 94kt and a V_2 of 96kt. In these circumstances V_2 and V_R (rotation speed) would be concurrent, rotation initiating at V_2 .

Initially, nosewheel steering was used to keep straight but above about 50kt the rudder was fully effective. Over-enthusiastic use of the powerful nosewheel steering on wet grass could lead to oversteering, the offset wheels simply sliding across the surface ineffectively. The earliest possible use of rudder was therefore essential, particularly with a strong crosswind, for which Lympne was renowned. The demonstrated crosswind limit was 25kt on a dry runway, but I am sure we often demonstrated something rather higher, particularly with a south-wester blowing up from Romney Marsh.

UP, UP AND AWAY

A firm pull at V_2 and the aircraft leapt into the air. The toe-operated brakes were then applied to stop the mainwheels rotating and the undercarriage was retracted. An engine failure after take-off presented no real problems and the control loads could be trimmed out, hands and feet off, at an asymmetric climb speed of 115kt with no more than 5° of bank towards the live engine. Normal two-engined climb speed was about 135kt, depending on weight, reduced by 1kt/1,000ft (300m) during the climb. Flap

retraction was normally delayed until passing 400ft (120m) and produced no noticeable sink, and only a slight nose-down trim change.

Once the flaps were retracted and the aircraft clear of all obstacles, power could be reduced to 14,000 r.p.m., the JPTs being controlled by the fuel trimmers to a maximum of 540°C (1,004°F), plus an allowance for the OAT. On reaching cruise altitude the aircraft was levelled off and allowed to accelerate to whatever cruising speed the power setting produced. The controlling factor was the JPTs, the throttles rarely being touched again until the beginning of the descent. However, under certain conditions the fuel-trimmer range might prove insufficient, the JPTs then being controlled by a further reduction of r.p.m. Normal operating speed (V_{NO}) was 205kt IAS (indicated airspeed). Fuel consumption in the cruise was of the order of 1,500lb (680kg)/hr.

The autopilot, a Smiths S.E.P. 2, could be engaged in the climb once above 1,500ft (460m) with the speed greater than 120kt. This unit was an improvement over those of the Bristol Freighter and DC-3, although it still lacked a coupled-approach facility and had no height lock. [Coupled approach: an instrument approach performed by the aircraft’s autopilot which is receiving position information and/or steering commands from onboard navigation equipment — Ed.] One trap for the unwary was the fact that there was no connection between the autopilot and the elevator trim control. Consequently, if the autopilot was engaged at, say, 135kt in



ABOVE “Mike Victor” aloft over familiar territory on England’s South Coast. Skyways began operating “air-coach” services, in which motor-coaches would pick passengers up from London and deliver them to Lympne, from the Kent airfield in the autumn of 1955, the subsidiary Skyways Coach-Air being established in October 1958.

the climb and left engaged on reaching cruise altitude, the elevators became increasingly out of trim as the aircraft accelerated. The only indication of this was a small trim gauge on the autopilot control box. The device would try to cope with this situation but eventually the trim load would become too strong and the autopilot would disengage itself, producing a strong shock through the aircraft which woke up the crew with a start and frightened the passengers witless. We were usually rewarded within a few seconds with a strong telling off by a coffee-stained stewardess; worse, we were in danger of losing our tea privileges for the rest of the trip.

CRUISING AND BACK TO EARTH

The 748 was very straightforward and pleasant to fly. There was a moderate nose-up change of trim with the application of power and also when the flaps were lowered from UP to the TAKE OFF position. All other changes of trim were small. It was one of the first aircraft to be fitted with an artificial stall-warning device, in the form of a “stick-shaker” on the captain’s control column, the effect of which could also be felt in the copilot’s position. The margin above the stall at which the shaker operated varied with the aircraft’s configuration, power setting and rate of approach to the stall.

The stall itself had no violent characteristics, although in a turn there was a gentle rolling tendency which could be corrected by means of the ailerons without introducing adverse characteristics. Recovery was immediate when

the conventional recovery action was taken. In virtually all configurations the stalling speed was greater than the minimum control speed (V_{MCA}) of 77kt with 0° , $7\frac{1}{2}^\circ$ or 15° of flap.

As the 748 was fully pressurised, it meant we could operate at higher altitudes than with the DC-3 (20,000ft/6,100m maximum), although the 748 Series 1 was often limited in performance at high all-up weights and high ambient temperatures. Even on long sectors we seldom flew above 12,000ft (3,650m). For flight planning purposes a TAS (true airspeed) of 190kt was used, which would give an IAS of about 165kt at cruise altitude in standard conditions. In the event of an emergency descent being required owing to cabin depressurisation or some other problem, the throttles were closed and the aircraft rolled into a steep descent at the V_{NE} (never-exceed speed) of 240kt.

For a normal descent giving maximum fuel efficiency, the fuel-datum trimmers were first run to the zero per cent position, the throttles were set to 14,000 r.p.m. and the descent was started, maintaining 205kt IAS. This would give a rate of descent of about 800ft (245m)/min. For a steeper descent the throttles would be closed until the torque meters showed not less than 50lb/in². This was to avoid reverse loading on the engine reduction gear. High rates of descent could be achieved at low power settings, the limiting operational factor being the rate at which the cabin could be brought down, usually not more than 500ft (150m)/min, to avoid it still being pressurised on short finals. For the

With everything down, G-ARMX is a moment away from settling on to the grass at Lympne. The 748's flap system was a particular source of pride for the Avro design team, the difference between the type's "clean" and "all-down" stalling speeds being a remarkable 30kt. At full 27½° deflection, the rear edges of the flaps bent down an additional 30° to give a final drag increase.

ALAN JACKSON

approach, the target threshold speed (V_{AT}) would be calculated according to the aircraft's landing weight (maximum for the Series 1 was 36,300lb/16,465kg). This would typically be of the order of 80kt.

If a holding pattern was required before making an approach, it would be flown at the minimum comfortable cruising speed with flaps up. This varied between 125kt at low weights to 145kt at higher weights. Once cleared for the approach, with speed below 180kt, the first stage of flap was lowered (7½°), followed by the second stage (15°) unless weight and temperature limited performance for the approach. The undercarriage was lowered once the speed dropped below 160kt.

Initial approach speed with 15° of flap was 100–110kt, slightly higher for an instrument approach. The final approach was flown at $V_{AT} + 15$ kt with the APPROACH FLAP setting of 22½°, reducing to $V_{AT} + 10$ kt and LAND FLAP (27½°) on short finals once the runway was in sight and landing was assured. The delay in lowering full flap was to guard against a late engine failure while still in cloud, in which case performance might be critical in certain cases on one engine with undercarriage and full flap down.

The landing was straightforward. It was essential to have the correct landing speed over the threshold when landing at Lympne, owing to the short landing distance available and the nature of the landing surface, particularly in wet weather when wheel-braking action was poor on wet grass. Touchdown was made on the mainwheels with as little hold-off as possible and the nosewheel lowered on to the ground. As soon as all wheels were in contact, the FLIGHT FINE pitch lever was withdrawn by the non-

handling pilot so that the props could run to the GROUND FINE position to give maximum propeller braking, which was very effective.

On long runways very little, if any, wheel-braking was required, the propellers' braking effect being sufficient to slow the aircraft to a good taxiing speed long before turning off the runway. Should there be a delay in withdrawing the FLIGHT FINE pitch locks, a horn would sound after a few seconds to warn the crew, because the JPTs would soon begin to rise if the props were hung up on the stops. It was also dangerous at this point to open the throttles again if the FLIGHT FINE lever had not been pulled or the stops had failed to withdraw, a situation which would be indicated by the prop-warning lights on the instrument panel. This had to be watched closely, for example on a practice touch-and-go, as the JPTs would immediately shoot up as soon as the throttles were opened, resulting in clouds of smoke and expensive-sounding noises issuing from the jetpipes.

OPERATIONAL FLYING

The 748 was always described as a DC-3 replacement and it was certainly an ideal aircraft for Skyways Coach-Air. However, sometimes the wet and soggy surface at Lympne defeated the aircraft, the mainwheels sinking into the mud up to their axles and requiring some heavy digging by the groundcrew to get them out again. The conditions were not improved by the actions of our somewhat eccentric airport manager, who was in the habit of disposing of the spoils from Skyways' Managing Director Eric Ryland's prize pig farm, of which there was a great deal, over its surface. This had an amazing retarding effect on take-off performance, which has probably

Now with the subsidiary Skyways Coach-Air titles applied to the fuselage, G-ARMV awaits another flight to the Continent at Lympe in May 1964. In July the following year the aircraft was written off in a landing accident in bad weather at Lympe. Miraculously, all passengers and crew escaped with minor injuries — see following pages.

PETER KEATING © A FLYING HISTORY LTD



never been scientifically investigated by the Air Accident Investigation Board. On one take-off the boundary fence was approaching at a frightening rate, with no sign of us becoming airborne, until we selected APPROACH FLAP which elevated us into the air in a truly remarkable fashion.

The majority of our flights were between Lympe and Beauvais, which at the height of the summer season could mean each crew flying up to three round trips per day. There was often a seventh sector to position for a night stop, with a further seven sectors the next day. I averaged at least 300 landings at Beauvais each year. We also operated a service from Castle Donington (now East Midlands Airport) to Beauvais, and from Lympe to Lyon, Montpellier, Strasbourg, Basle, Clermont-Ferrand and Tours in France and occasionally to Ostend in Belgium and Amsterdam and Rotterdam in The Netherlands, so there was a good deal of variety.

I am glad to say that nothing very exciting happened generally, the nearest thing to a drama being on a flight from Lyon to Lympe in the clag, when we flew into an embedded thunderstorm. This was before we had weather radar fitted and there had been no other warning signs. We suddenly found ourselves in severe turbulence, being bombarded with cricket-ball-sized hailstones which carried away our ILS (instrument landing system) aerial and the rotating beacon on top of the fin. They also seriously modified the nose, leading edges of the wings, fin and tailplane, fortunately without adversely modifying the aeroplane's flying characteristics. Much hammering was heard from the hangar during the night.

The early summer of 1968 was an interesting

AVRO/HS 748 SERIES 1 DATA

Powerplant 2 x 1,740 e.h.p. (1,600 h.p. + 370lb jet thrust at 14,500 r.p.m.) Rolls-Royce Dart R.Da.6 (Mk 514) turboprop engines driving Rotol four-bladed constant-speed fully-feathering propellers of 12ft (3.66m) diameter

Dimensions

Span	95ft 0in	(28.96m)
Length	67ft 0in	(20.42m)
Height	24ft 10in	(7.57m)
Wing area	794.9ft ²	(73.85m ²)
Wing chord		
at root	11ft 5½in	(3.49m)
at tip	4ft 8in	(1.42m)

Wing section

at root	NACA 23018
at tip	NACA 4412

Dihedral

Incidence	3°
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Weights & loadings

Empty, equipped	19,444lb	(8,819kg)
Max payload	9,666lb	(4,385kg)
Max loaded	33,000lb	(14,969kg)
Wing loading	41.5lb/ft ²	(202.6kg/m ²)
Power loading	10.3lb/h.p.	(4.67kg/h.p.)

Performance

Maximum speed		
at 17,500ft (5,300m)	294 m.p.h.	(473km/h)
Cruising speed		
at 20,000ft (6,100m)	265 m.p.h.	(426km/h)
Stalling speed	81 m.p.h.	(130km/h)
Rate of climb		
at sea level	1,350ft/min	(410m/min)
Service ceiling	30,500ft	(9,300m)
Normal range		
w/ max payload	675 miles	(1,085km)

Source: *Jane's All The World's Aircraft, 1960-61*



period, as during the civil unrest in France at that time all normal air traffic control services stopped working. We continued to fly to Beauvais in VFR (visual flight rules) conditions, the airfield being fully manned, although nobody would actually speak to us on the radio. We still flew via the usual airways route but at low level, communicating with each other on a common VHF frequency so that we all knew where the other aircraft were around the route.

On one flight we were called up by Skyops as we were starting off across the Channel and were told that a hostile crowd of the local peasantry were on their way to Beauvais with the intention of forcing the airfield to close. With visions of scenes from *A Tale of Two Cities* in our minds and the sound of tumbrels on cobbled streets in our ears, we took the coward's way out and returned to Lympe. After this we were ordered by the French authorities to fly to the military airfield at Creil, to the north-east of Paris, which we did until the beginning of June, when everything returned to normal.

The most significant event of the late 1960s at Skyways was the building of a hard runway and taxiways at Lympe, the airfield then changing its name to Ashford International, otherwise known as the Garden Airport of Kent on account of its white picket fences, children's play area and the huge numbers of geraniums and other plants placed around the airport buildings — courtesy of Mrs Rylands' garden centre. The runway was first used on April 11, 1968.

Building the new runway caused great excitement, particularly when the bulldozers began to unearth strange-looking bags of an unknown substance, connected together by means of electrical cables. These turned out to be highly unstable explosives which had been buried during the war so that the entire airfield could be destroyed in case of an invasion. These had been completely forgotten after the war and had lain quietly rotting away ever since — and we had been landing on them! From time to time, as we were taxiing out, we would see a bulldozer suddenly stop and the driver take to his heels across the airfield as another bag was uncovered. Eventually, they were all removed with the help of the Army and a local resident who still had a wiring diagram, a layout plan of the scheme and knew where the vital switch was located.

In October 1969 I was asked if I would like to be seconded to Hawker Siddeley to take part in a 748 sales tour of Africa. Of course I readily agreed — but that is another story . . .



COMING SOON *The author looks back on flying the 748 on a Hawker Siddeley sales tour of West and South Africa during October–December 1969*

A MIRACULOUS ESCAPE: THE DEMISE OF G-ARMV

ON SUNDAY, JULY, 11, 1965, the first production 748 Series 1, G-ARMV, was on a scheduled Skyways Coach-Air flight from Beauvais to Lympe, carrying four crew and 48 passengers. Before taking off the pilot-in-command obtained a weather report from Lympe, which gave a cloud ceiling of 250ft (75m), visibility of 2,000m (1¼ miles) and a surface wind of 18kt from 220°.

The 748 departed Beauvais at 1551hr UTC on an instrument flight rules (IFR) flight plan. As the aircraft passed Abbeville, radio contact was established with Lympe and a weather report obtained, which gave a visibility of 1,000m (3,300ft) in drizzle, a cloud ceiling of 250ft and a surface wind from 220° of 18kt gusting to 26kt.

The airline's limits for landing on Runway 20 at Lympe were a runway visual range (RVR) of 1,100m (3,600ft) and a cloud ceiling of 200ft (60m). The pilot again checked the landing conditions at Lympe before commencing an instrument approach and, although conditions had not altered significantly since the previous report, he was informed of a "slight improvement", although the wind was still gusting. The final instrument approach to Runway 20 using radar began at four miles (6.5km) from touchdown, when the aircraft was in cloud at 1,100ft (330m) in turbulent conditions. At 3½ miles (5km) from touchdown the pilot began to descend at 350–400ft/min (107–120m/min), the equivalent of a 3° glidepath in the prevailing conditions.

As there was no radar glidepath, the Lympe radar controller advised the pilots of the height at which the 748 should be at each mile before touchdown. When it was about ⅓ of a mile (1km) from touchdown the radar controller gave a final heading correction, and at half a mile (0.8km), when the talkdown finished, he told the pilots that the aircraft was lined up with the right-hand edge of the runway. The rest of the approach was made visually, although the radar controller observed the 748 deviating further to the right of the extended centreline as it neared the touchdown point.

The pilot stated that at 220ft (65m), when half a mile from touchdown, he could see the far boundary of the aerodrome through heavy drizzle. Height was maintained for 3–4sec, then the descent was resumed. At 150–200ft (45–60m), full flap was selected and power reduced to 10,600 r.p.m. By this time the turbulence was becoming severe and the pilot realised that the aircraft was drifting to the right of the runway; he decided not to try to regain the centreline, as it would require a turn at low altitude.

As the aircraft approached the threshold, the airspeed indicator was fluctuating but an attempt was made to maintain 92kt. The flare-out was initiated at 30–40ft (9–12m) at an indicated air speed (IAS) of 88kt, but as the throttles were closed the starboard wing dropped. Although the pilot was aware that the aircraft was descending rapidly, he was initially more concerned about keeping the wings level; only at the last moment



did he try to check the rate of descent with elevator control. The aircraft struck the ground heavily on its starboard mainwheel, after which the starboard wing, engine nacelle and undercarriage were torn off. The 748 rolled over to starboard and slid along the grass inverted, coming to rest after having swung through 180°. There were no fatalities. The official accident report stated that the probable cause was “a heavy landing following an incomplete flare from a steeper than normal approach”. It was a miraculous escape — but G-ARMV had earned the dubious distinction of being the first 748 to be written off in an accident. **NS**

ABOVE A superb photograph of G-ARMV at Catania, Sicily, during one of its early route-proving trials. Skyways was, along with fellow British airline BKS Air Transport Ltd, a launch customer for the 748, ordering three before the prototype had even been completed. Note Mount Etna rising majestically in the background.

BELOW The morning after — G-ARMV is manhandled away from the landing area at Lympe the day after the accident. Once the aircraft had come to rest, the passengers were left hanging upside down in their seats, including a mother holding her baby, which was not strapped in. Thankfully nobody was badly injured.



Kellyinspirin'rich
thinkin'skunkwork
in'reconseein'two
seatin'intelligence
gatherin'J58drivin'
JP7burnin'missile
avoidin'MiGlosin'
high-flyin'record
settin'Mach-bustin'



GIANT REACH: THE LOCKHEED SR-71 IN EAST ANGLIA, 1974-90

During the 1970s and 1980s the distinctive shape of the Lockheed SR-71 Blackbird always turned heads over the Suffolk countryside, despite being a regular sight for locals living within a J58's roar of the type's base at Mildenhall. **BOB ARCHER** documents the genesis and operational career of the 9th SRW's Detachment 4, which operated the mighty Blackbird from the base for some 16 years



IN OCTOBER 1989 the government of the USA withdrew all funding for Lockheed SR-71 flight operations, effectively grounding the type, including the pair located at RAF Mildenhall in eastern England. Even though the unique nature of the intelligence captured by the aircraft's sophisticated sensors was deemed vital to strategic-defence planning, operations with it were incredibly expensive, consuming millions of dollars annually in budgetary costs. Indeed, it was so expensive that senior officials with their hands on the financial tiller sought to axe the programme in favour of more glamorous fighter budgets. Despite attempts by politicians to restore the SR-71 to active duty, the type was ultimately "killed off" by a Presidential mandate. Thus ended a quarter of a century of aviation history performed by a truly exceptional aircraft.

SNAKES, BIRDS AND CROWNS

The SR-71 was a familiar sight in the skies of East Anglia for almost 16 years. It flew from RAF Mildenhall in Suffolk; the base was one of only three locations worldwide which regularly hosted this extraordinary aircraft, the others being Beale AFB in California and Kadena Air Base (AB) on Okinawa, Japan. Crews at the latter applied the nickname "Habu" to the type, as it resembled a deadly poisonous snake which inhabited the island. The locals around Mildenhall preferred the more familiar "Blackbird".

The SR-71 programme was codenamed *Senior Crown* for funding purposes, although the name was not widely known beyond official corridors. The appearance of the first SR-71 in the UK was widely publicised, however, as was its departure from service 16 years later; a period during which the SR-71 was a significant part of aviation in East Anglia, albeit shrouded in a veil of secrecy. Despite the latter, its missions from Mildenhall were fairly predictable, given the familiar telltale sights and sounds of a typical SR-71 departure: the early launching of Boeing KC-135Q tankers; the departure of each SR-71 mission precisely on the hour in complete radio silence, with a torch signal from the control tower to instigate take-off; and an earth-shattering roar from the two Pratt & Whitney J58 engines.

Blackbird missions to the Arctic or Baltic Sea regions were usually of 4–5hr duration, and the casual observer could easily work out an approximate time of return. An 0800hr departure usually signified a lunchtime return. Often the

SR-71 would land back at Mildenhall around 1300hr, a perfect time for the astute photographer, particularly after training missions when the pilot and Reconnaissance Systems Officer (RSO) were happy to perform an overshoot. Ground support technicians much preferred to work on an aircraft which had cooled slightly, which an overshoot helped to produce. At altitude the external surfaces of the SR-71 heated up significantly, reaching temperatures of 500–1,000°C (930–1,830°F), the titanium used in its construction remaining hot once back on the ground.

Initially SR-71s were forward-deployed to Kadena from March 1968, for missions over North Vietnam and to monitor other potentially hostile nations in South-east Asia. Detachment 1 of the USAF's 9th Strategic Reconnaissance Wing (SRW) was established at Kadena to control the activities of the deployed SR-71s, a type which for many years was a total stranger to Europe.

The first recorded SR-71 transatlantic mission was completed in October 1973 during the Arab-Israeli Yom Kippur War, when an SR-71A flew from Griffiss AFB, New York, to monitor Egyptian, Jordanian and Syrian troop locations, enabling America's ally Israel to adjust its forces' tactics and turn the tide in its favour. The lengthy mission highlighted the need for the USA to be able to utilise air bases in Europe as forward-operating locations on an occasional basis.

The initial wish of Strategic Air Command (SAC) was to operate a small detachment of SR-71s from Torrejón AB in Spain, but the Spanish government refused to allow overt reconnaissance to be undertaken from its territory. The UK's Ministry of Defence (MoD) also declined to permit SR-71 operations from Mildenhall, worrying that such support for the USA might inflame relations with Arab nations and disrupt oil supplies. However, negotiations between the USA and the MoD for an "occasional" operating base in the UK were agreed in principle during 1974.

The feasibility of such operations still needed to be evaluated, though, and the Americans decided to send an example to England. To enable the operation to raise little suspicion as to the true nature of the visit, the flight was to be staged under the full glare of publicity. Two transatlantic legs were flown in an attempt to capture the fastest crossing times for the outward mission between New York and London, and between London and Los Angeles on the homeward section.

On September 1, 1974, Majors James V. Sullivan,

OPPOSITE PAGE *Looking like a malevolent insect, Lockheed SR-71A Blackbird 61-7962 makes its way from the parking area on to the taxiway at Mildenhall on December 6, 1984. Measuring some 107ft (33m) in length, the aircraft was powered by two huge 32,500lb-thrust Pratt & Whitney J58 turbojets.* ALL PHOTOGRAPHS BY THE AUTHOR

The first SR-71 to visit the UK was 61-7972, which set a new transatlantic time over distance record during its flight from Beale AFB in California to Farnborough on September 1, 1974. The aircraft is seen here six days later at the SBAC show at Farnborough. The previous record of 4hr 46min, set by an RAF Phantom between London and New York, was demolished by the Blackbird, which flew New York—London in 1hr 55min.



pilot, and Noel F. Widdifield, RSO, crossed the starting line above New York in SR-71 61-7972 at approximately 80,000ft (24,400m) and at a speed of more than 2,000 m.p.h. (3,220km/h). Exactly 1hr 54min 56.4sec later, they had set a new world speed record. The aircraft averaged 1,817 m.p.h. (2,924km/h) over the 3,488-mile (5,612km) course, slowing to refuel just once from a KC-135Q. The SR-71 landed at Farnborough, where it stole the show as a static display exhibit at that year's SBAC show. It marked the first time the distinctive SR-71 had been on public display outside the USA.

Another historic speed record was set on the return journey, when pilot Capt Harold B. Adams and RSO Maj William Machorek set a new record from London to Los Angeles, covering the 5,645 miles (9,084km) in 3hr 47min 39sec at an average speed of 1,480 m.p.h. (2,382km/h). The difference in the two speed records was owing to refuelling requirements, and the need to reduce speed over major American cities. Despite precautions being taken, broken windows were reported in the Los Angeles area owing to the SR-71's sonic boom. The aircraft's arrival time in Los Angeles was almost four hours before its departure time from London, owing to the 8hr time difference between the UK and California. The departure airfield in the UK was RAF Mildenhall, which enabled personnel of the 9th SRW to conduct an unhindered and successful evaluation.

BLACKBIRD IN BLIGHTY

More important than the record flights was the completion of the feasibility study into operations from RAF Mildenhall. The USA notified the MoD that it would like to begin operations on an ad hoc basis. The MoD approved the request in principle, with the proviso that operational detachments be restricted to a maximum of 20 days in duration, and that ministerial approval would be required for each visit. Accordingly, SR-71 visits to the UK were rare and short in the early days.

The first operational Blackbird deployment to Mildenhall began when 61-7972 returned to the Suffolk base on April 20, 1976, for a ten-day stay. The station also housed a single Lockheed U-2R at the time, hangared on the south side of the airfield where it was taken immediately on landing, to enable its precious film to be extracted from the cameras. The occasional SR-71 deployment was kept separate, although the two aircraft were housed within the same area.

The U-2R needed no aerial support, as its glider-like capabilities enabled 10hr missions to be flown with ease. In contrast, the SR-71 required the services of several KC-135Q tankers carrying the special JP7 fuel unique to the Blackbird. The 17th Bomb Wing (BW) operated the KC-135Qs from Beale AFB during 1975–76, until they were reassigned to the 100th Air Refuelling Wing (ARW) in September 1976. Eventually the tankers were amalgamated into the 9th SRW.

European SR-71 operations were ostensibly to coincide with major Nato exercises; but, as aircraft residency increased, so missions were specifically organised for dedicated intelligence-gathering requirements. The first operational strategic reconnaissance missions began in May 1977, when SR-71 61-7958 was flown to Mildenhall. The historic first mission took place on May 20, to satisfy a US Navy request for high-resolution radar imagery and electronic intelligence (ELINT) sensor recordings of the nuclear and conventional submarine operations and port facilities in the Murmansk area. The mission was a joint effort with 55th SRW RC-135V *Rivet Joint* 64-14846, which also flew from Mildenhall. The Top Secret mission was probably flown to enable the SR-71 to capture "emitter" traffic across the airwaves produced to monitor the *Rivet Joint* and for the *Rivet Joint* to do the same for the Blackbird.

The tasking of SR-71 missions was approved at the highest level of both the American and UK governments, with locations of primary interest being situated behind the "Iron Curtain",

Blackbird 61-7958 is towed into position as the star exhibit in the static display at the Mildenhall Air Fête on May 29, 1977, the first time an SR-71 was put on display at the Suffolk airbase. This airframe made a total of four visits to Mildenhall, the last being from September 1983 to June 1984.



particularly East Germany and the Soviet Union. One particular focus of interest was the vast military complexes in the vicinity of the southern Barents Sea around the Kola Peninsula, chiefly around the Murmansk Oblast. Although the SR-71 had previously flown directly overhead North Vietnam to obtain data, overflights could not take place above eastern European countries or Russia. Therefore European Blackbird missions were restricted to observing activities from the peripheral safety of international waters, or above friendly territory. Nine visits to the area took place during the 1970s, although as the decade drew to a close the need for additional, lengthier stays began to become apparent.

One noteworthy Blackbird mission was undertaken during early March 1979 to monitor the situation between the Republic of Yemen and its Saudi Arabian neighbour. The Yemenis appeared to be on the brink of invading Saudi territory, with the American authorities anxious to gain intelligence on Yemeni intentions. Accordingly, faithful 61-7972 was despatched to Mildenhall to perform the lengthy mission. After two cancelled missions, '972 was airborne before dawn on

day three, and completed its tanker rendezvous before streaking into the sunrise across the Mediterranean. Two more aerial refuellings were completed before '972 headed for the target area. A glitch in the automated navigation system resulted in the aircraft accidentally overflying the planned turning point, as the optical bar camera in the nose and the various individual cameras in the chine bays captured their imagery. The delay in completing the turn produced unexpected results, yielding much valuable additional data. The crew returned to Mildenhall after completing a 10hr mission.

This sort of mission was fairly uncommon, however, most being conducted to gather intelligence from the Soviet Union and its Warsaw Pact allies. Blackbird missions frequently involved departing Mildenhall and flying north around Norway before undertaking activities in the Barents Sea and White Sea areas. Others involved overflying the Baltic Sea to look deep into Poland, East Germany and Russia. Subsonic missions along the border between East and West Germany were also undertaken.

Blackbird 61-7979, which had arrived in mid-

With engines running, 61-7972 prepares to depart Mildenhall on September 12, 1974, having completed a USAF evaluation of the type's suitability for UK-based operations. Blackbird '972 was joint most frequent visitor to the UK, along with 61-7964, both being deployed six times to Mildenhall during the type's European operational career.





LEFT Major Tim McCleary (pilot, left) and Lt-Col Stan Gudmundson (RSO) shake hands before the penultimate SR-71 return flight to the USA on January 18, 1990. Given the extreme altitudes at which the Blackbird operated, special pressure suits had to be worn by its crews. The David Clark S-1030 suit offered full protection in the event of a cabin depressurisation at altitude.

BELOW In August 1981 Blackbird 61-7964 became the first Det 4 SR-71 to divert to a foreign airfield when it suffered engine problems during a mission. Seen here at Mildenhall in November 1981, the aircraft has been "tagged" by Military Airlift Command groundcrew, who have chalked "MAC & Crew" and "For sale" on its port fin.

April 1979, departed Mildenhall for home on May 2 the same year, the day before the Labour government was swept from power and Margaret Thatcher became the new Prime Minister. The new administration was much more amenable to the USA extending its UK SR-71 operations, although initially this was undertaken on a gradual basis. The final UK Blackbird deployment of 1979 was of serial 61-7976, which arrived on October 18 and stayed for 26 days. Before this symbolic deployment, Detachment 4 of the 9th SRW had been formed at Mildenhall during March 1979. The unit also became responsible for the ongoing U-2R operation, with one aircraft almost permanently in residence, as well as the occasional SR-71 presence. European SR-71 operations were codenamed *Giant Reach*.

Throughout 1980 the duration of the SR-71's UK deployments lengthened and by the end of the year Det 4 was operating the type virtually full-time. This increased further during 1981 and, on April 5, 1982, the MoD received Prime Ministerial

approval to allow Det 4 to operate on a permanent basis, with two SR-71s assigned. However, the MoD still retained final approval of the more sensitive missions. The aircraft continued to operate from the hangar complex on the south side, but it became evident that a permanent, more suitable pair of barns would have to be constructed. Work on these began in 1985, with 61-7962 having the honour of christening the new complex upon returning from a mission on August 8 that year.

THE BODØNIAN EXPRESS

Mildenhall was the SR-71's primary operating base in Europe, although the changeable weather conditions called for a number of diversionary airfields to be established. Blackbird missions frequently took the aircraft above the Baltic Sea, around the top of Norway into the cold Arctic region to monitor military complexes in northern Russia. Thus the USA approached the Norwegian government, which agreed in principle that, in





AUTHOR'S COLLECTION

an emergency, its bases could be used. The first occasion on which an aircraft was diverted was on August 13, 1981, when 61-7964 landed at Bodø AB, while on a combined mission/delivery to Mildenhall from Beale AFB. The aircraft suffered an oil malfunction in one of the engines. Rather than risk flying the ailing aircraft to Mildenhall, the crew elected to divert to Bodø.

A KC-135Q full of technicians and spare parts was hastily despatched from Beale and arrived at Bodø, within the Arctic Circle, at around 0700hr the next day. Repairs commenced immediately and continued late into the night. With no hangar available, '64 was left outside, a new experience for the California-based personnel. The technicians were back at work early the following day and eventually restarted one engine, although the other refused to ignite. With little fuel remaining in the SR-71's tanks, an orbiting KC-135Q, which had launched from Mildenhall to assist with the final leg of the journey, elected to land at Bodø. The overweight tanker ran off the runway, sank into the soft earth and had to be pulled out. Eventually both SR-71 engines started, and preparations were made for departure, but not before the name *The Bodonian Express* and a small white crab had been applied to the Blackbird's fins.

Detachment 4 increased to two aircraft on December 19, 1982, when 61-7971 arrived to join '972. With two Blackbirds stationed in the UK, the USAF began to undertake many more missions and expand its area of interest, acquiring more peripheral photography of eastern Europe and the Middle East. This enabled planners to increase the number of missions flown with a corresponding

ABOVE *Blackbird 61-7975 on a mission over the USA in May 1982. This aircraft made only one sojourn to the UK to operate with Det 4, during July–October 1984. The SR-71A was painted overall in a black “iron ball” radar-attenuating finish which also helped to radiate heat away from the aircraft. The national insignia were applied in a specially-formulated heat-resistant paint.*

growth in the quantity of intelligence obtained. The aircraft could not fly supersonic overland, as the shockwave would have created catastrophic damage. However, missions over water could be accomplished at the aircraft's design cruise speed of Mach 3+. Although the need for secrecy prevented details from emerging at the time, subsequent releases have highlighted that many missions to the militarised region of north-west Russia were on behalf of the US Navy.

Formerly classified documents have confirmed that the SR-71s frequently flew to an area off the coast of Murmansk to monitor the Soviet Northern Fleet's submarines. The strategic submarine base at Gadzhiyevo and the Northern Machine Building Production Association plant at Severodvinsk were of primary interest. The US Chief of Naval Operations, Adm James L. Holloway III, requested regular SR-71 missions to the region, having highlighted five naval bases of particular interest: Gadzhiyevo; Gremikha (now known as Ostrovnoy); Severomorsk; Vidyayevo and Zapadnya Litsa; between them they housed the Northern Fleet, which controlled the lion's share of Russia's nuclear submarine force.

On July 9, 1983, SR-71A 61-7962 settled on to the runway at Mildenhall after a lengthy ferry flight from Beale AFB. To the casual observer this was just another SR-71, unlikely to cause too much



ABOVE Just another routine landing at Mildenhall for 61-7962 — or is it? It is in fact the Palmdale-based test airframe, 61-7955, arriving in the UK under a false identity on July 9, 1983, a subterfuge that remained secret for more than a decade. The aircraft was in the UK to undergo trials with the new Goodyear ASARS-1 radar system.

excitement, as the same aircraft had been deployed to Mildenhall before, having spent more than two weeks there during September 1976. Except that this was a clever subterfuge — it was not '962 at all. It was actually 61-7955, the Palmdale-based test aircraft, which was evaluating the new Goodyear Advanced Synthetic Aperture Radar System (ASARS-1). The decision to apply a different serial for the duration of the stay in England was taken to mask the true purpose of a test aircraft flying a rare operational mission overseas. The subterfuge worked, and the full details stayed buried for more than a decade. The aircraft stayed long enough to complete the evaluation before returning home and reverting to its true identity; ASARS-1 was subsequently installed in Blackbirds for specific missions.

OPERATION EL DORADO CANYON

By the mid-1980s the belligerent sabre-rattling of Libya's leader Muammar Gaddafi had significantly increased, as the Colonel encouraged his supporters to become more aggressive to non-Muslim governments, and the USA in particular. Coupled with his financial backing of terrorist groups, Gaddafi and his regime became a thorn in the side of the American government. Confrontation seemed the only solution to silence this "loose cannon". A build-up of USAF tanker aircraft at RAF Fairford and Mildenhall heralded the likelihood of an air strike, and on the evening of April 15, 1986, the 20th and 48th Tactical Fighter Wings launched EF-111As and F-111Fs respectively from RAF Upper Heyford

and Lakenheath. The latter were used to strike targets in Libya while the EF-111A "Spark-Varks" provided electronic jamming.

Codenamed Operation *El Dorado Canyon*, the mission was moderately successful, and had the desired effect of silencing the vociferous Colonel. Post-strike photography was completed by the two Mildenhall-based SR-71s, with both aircraft being airborne simultaneously. A dual mission was flown on April 16 and on the two following days, as cloud cover hampered an effective take until the third mission. Images captured on film were taken from the aircraft and processed before being loaded aboard C-135C 61-2669, assigned to the USAF Chief of Staff. The imagery was deemed of such importance that the Chief of Staff himself, Gen Charles Gabriel, accompanied the film from Mildenhall back to Washington DC for analysis. This was the only occasion on which Det 4 flew both its aircraft together operationally.

Not all missions went so smoothly. On May 24, 1987, the pilot of 61-7973 managed to overstress the aircraft while on a mission. The Blackbird recovered safely to Mildenhall, but inspection revealed that temporary repairs would be required to enable a flight back to Palmdale for further analysis. The aircraft returned to the USA on July 22, although the prospect of the programme being terminated may have forestalled the expensive repair work being undertaken. The aircraft subsequently remained in storage with Lockheed at Palmdale, where it was later placed on display in the Blackbird Airpark.

Blackbird 61-7964 was no stranger to Norway.



ABOVE Leaving a heat haze in its wake, 61-7958 taxis out from the barns to the end of the runway at Mildenhall on June 2, 1984. The total weight of the aircraft for a mission was usually more than 50 tons (50,800kg), of which almost 40 per cent was low-volatile JP7 fuel. Note the numerous support vehicles accompanying the Blackbird.

Having been the first to divert there in August 1981, the aircraft visited the country twice more while on operations. On March 6, 1987, '964 suffered a technical problem, requiring the crew to divert. Three months later, on June 29, the same aircraft landed in Norway again. The March visit obviously caused the technicians some extensive headaches, as the SR-71 was stranded in Norway for around 14 days. The second diversion must have been more straightforward to rectify, as '964 flew back to Mildenhall three days later.

Detachment 4 was never short of missions. The Middle East was frequently the target area, following the escalation of tension between confrontational nations. Missions to the region were also launched by Det 1 from Kadena. The French government characteristically refused authority to overfly its territory, resulting in Blackbird missions from Mildenhall being routed around the Iberian peninsula.

It was clear that the SR-71 was an extremely flexible reconnaissance platform, even though it was hugely expensive to operate. However, many senior USAF planners in the Pentagon were from the fighter community, and, owing to the classified nature of SR-71 operations, were largely ignorant of the type's precise capabilities. Some wanted the SR-71 to be killed off to save money, which, they argued, could be better spent on more useful programmes. General Jerome O'Malley, a former pilot with the 9th SRW, was one of the most staunch supporters of the SR-71 programme, as he clearly knew the capabilities and value of the Blackbird. He became Commander of Tactical Air

Command (TAC) in 1984, and was widely tipped to become the USAF Chief of Staff. However, tragedy struck on April 20, 1985, when the T-39 Sabreliner carrying O'Malley crashed at Wilkes-Barre airfield in Pennsylvania, killing all aboard. Without guidance from O'Malley, the end for the *Senior Crown* programme hove into view. General Larry Welch, the C-in-C of SAC, eventually became Chief of Staff and set about eliminating the SR-71 from service. It was ironic that the single most vociferous opponent of *Senior Crown* had also been the head of SAC, its operating command, and therefore was more aware than most of its distinctive capabilities.

THE BEGINNING OF THE END

On October 1, 1989, the first day of fiscal year (FY) 1990, the USAF issued an order suspending all SR-71 operations, except for proficiency flights. On November 22 the same year all USAF SR-71 operations were terminated. Those at Det 4 had ceased two days earlier when 61-7967 had flown the last operational mission. The aircraft was fitted with an optical bar camera in the nose, which was unusual for the Mildenhall Blackbirds. The crew must have been aware that this was likely to be their last mission for a while, as they performed several overshoots before settling the giant aircraft on to the Mildenhall runway for the last time operationally.

The two Blackbirds remained securely tucked away in their barns for the next few weeks, while final plans were made for the Detachment to return the aircraft to the USA and disband. On



ABOVE Blackbird 61-7964 is prepared for its final journey home in one of Mildenhall's purpose-built barns on January 18, 1990. The barns were erected to house Det 4's two operational Blackbirds, and a large hangar provided accommodation for the reconnaissance interpretation equipment. Note the barn floor, awash with JP7 fuel — the SR-71 leaked like a sieve until the airframe heated up in flight and the joints tightened.



LEFT With a nod to one of the local pastimes, the sign beside Det 4's hangar at Mildenhall depicted a Blackbird and a U-2 superimposed on a dartboard with a dart firmly embedded in the bullseye. The motif was only ever applied to the fins of one aircraft, 61-7980, in 1990, but was quickly replaced with NASA logos.

BELOW Trailing its distinctive "tiger tails", 61-7964 blasts off from Mildenhall for the last time, on January 18, 1990. On taking off from Mildenhall, SR-71 pilots would bank slightly to starboard, offering spectators a thrilling view of the diamond-pattern shockwaves.





ABOVE With vortices streaming from the aircraft's fuselage and engine nacelles, 61-7980's starboard J58 coughs out a tail of flame during a particularly spirited display at the Mildenhall Air Fête in May 1986. The result of a temporary flame-out, unburned fuel ignited in the hot jet efflux, throwing out a fireball. The aircraft landed safely.

January 16, 1990, both aircraft flew a functional check flight to ensure all systems were in order and working correctly.

Two days later the press was admitted to watch Lockheed technicians prepare 61-7964 for the journey home. Access to the barns was available to all, with the two crew members, Maj Tom McCleary (pilot) and Lt-Col Stan Gudmundson (RSO) freely chatting to the media. Shortly before lunchtime the aircraft spooled into life, and with all systems functioning normally, taxied to the Mildenhall runway for the last time. With a characteristic roar and with diamond shockwaves dancing in the clear winter air, the Blackbird gracefully lifted from the runway and flew a 360° pattern to perform a fast, very low fly-by, before McCleary pointed the nose skyward and headed for Beale. The next day 61-7967 departed, to considerably less fanfare, marking the end of a unique era. On January 26, 1990, an SR-71 decommissioning ceremony was staged at Beale, with Gen Welch, the main architect of the type's demise, in attendance.

Detachment 4 had flown a total of 894 operational missions, with a further 164 being functional, test or delivery flights. Blackbird 61-7960 earned the distinction of performing the most operational missions, completing a total of 342. This aircraft spent 15 months assigned to Det 4 from late 1985 until early in 1987.

The SR-71 had obtained significant intelligence data during its 25 years of operations, enabling key military planners to advise policymakers accordingly. Many senior politicians with the appropriate security clearances were privy to

the material obtained, and used it to guide their decision-making for national and international policy. There were frequent calls for the SR-71s to be reactivated for Operation *Desert Shield* in 1990, but these requests were denied. However, continued instability in the Middle East, combined with ethnic violence in the Balkans, provided an impetus for the pro-SR-71 lobby to become increasingly vocal. During the spring of 1994, a deterioration of relations between the USA and North Korea was, to many, the final straw. The SR-71 was needed to monitor the situation in these regions, with many senators and congressmen joining the call for the programme to be reinstated.

Despite the SR-71 no longer being operated by the USAF, the National Aeronautics & Space Administration (NASA) at Edwards AFB in California continued to operate one SR-71A and one SR-71B on high-altitude test missions, with another SR-71A held as a spare. The Administration's usage was well placed, as Congress appropriated \$100m in the FY 1995 defence budget to reactivate all three in USAF service. A programme office was established at Wright-Patterson AFB, Ohio, to oversee the reactivation, with the aircraft being assigned to a detachment of the 9th Reconnaissance Wing. Despite the Wing's headquarters being located at Beale under Air Combat Command, the SR-71 operation was to remain at Edwards AFB as the newly-formed Detachment 2.

On April 15, 1996, Deputy Defense Secretary John White directed the USAF to ground the SR-71. This was just one of many hurdles which



the SR-71 cruised over on its rocky path back to operational status, although the number of airframes to be reactivated was dropped to just the two SR-71As.

Lockheed Martin was contracted to prepare the two aircraft for operational duty, while the two erstwhile overseas operating locations, Kadena and Mildenhall, began to prepare for possible deployments by the SR-71 on an occasional basis. The Balkans, embroiled in civil war, was one of the most likely areas of interest, as were hostile Middle Eastern nations. Both of these "hot spots" could be covered from Mildenhall.

On January 1, 1997, Det 2 at Edwards was declared mission-ready. The two SR-71As, 61-7967 and 61-7971, adopted the dark-red fin band of the 9th RW containing the familiar four Maltese crosses and the tailcode "BB." It seems logical to assume that the USAF would not devote so much funding to the programme just to have the aircraft flying training missions over the high desert around Edwards AFB. Thus the return of SR-71 operations to Mildenhall seemed a certainty.

NOT SO FAST . . .

The *Senior Crown* programme had few friends at top level within the USAF, however, and Chief of Staff Gen Ronald Fogleman was against its reactivation from the outset. Despite considerable political will to see the programme reactivated, the primary operator's negative stance presented a massive hurdle. It was to be one which even the fastest operational aircraft in history could not overcome. Less than a year after the Blackbird was declared operational again, all funding for SR-71 operations in FY 1998 was withdrawn. On

ABOVE *Blackbird 61-7974 is firmly anchored to the ground for static engine runs at Mildenhall in May 1982. The distinctive chined forward fuselage provided useful additional lift at supersonic speeds. The Blackbird's innovative air inlet control system (AICS) featured movable spikes that travelled some 26in (66cm) fore and aft to regulate airflow to the engines.*

October 15, 1997, President Bill Clinton imposed a Line Item Veto on SR-71 funding, effectively killing off the programme. Two weeks later HQ USAF directed the termination of all SR-71 operations, and ordered a swift disposal of the fleet. The veto prevented any further opportunity by politicians to rekindle SR-71 operations at a future date. The revitalised programme did not perform any overseas deployments, and the preparations at Mildenhall for a possible return were quietly abandoned.

The final movement by an SR-71 in the UK was not by air, but was completed at a far more sedate pace, with 61-7962 being dismantled and taken by road from Palmdale to board a ship bound for England. The final part of the journey was again by road, to the Imperial War Museum at Duxford, Cambridgeshire, to become one of the star exhibits at the new American Air Museum. The Blackbird arrived on April 11, 2001, and, following reassembly, was formally handed over by Gen Joseph Ralston, Supreme Allied Commander Europe, at a ceremony held on June 14 the same year.

To some, the static exhibit lacks the intensity associated with the Blackbird's daily operations. The stillness arguably obscures the dangers which the aircraft and its crews faced every time they flew operationally, close to the borders of hostile

LOCKHEED SR-71 VISITS TO THE UK, 1974–1990

SOME 36 VISITS to the UK were made by 14 individual Blackbirds (including one under a false identity) for stays of varying duration between September 1974 and January 1990, when the last example left the UK. The visits by the individual aircraft are listed here in chronological order.

September 1–13, 1974	61-7972	December 19, 1982–July 6, 1983	61-7972
April 20–30, 1976	61-7972	December 23, 1982–February 2, 1983	61-7971
September 6–18, 1976	61-7962	March 7–September 6, 1983	61-7980
January 7–17, 1977	61-7958	July 9–30, 1983	"61-7962"
May 16–31, 1977	61-7958		(actually
October 24–November 16, 1977	61-7976		61-7955)
April 24–May 12, 1978	61-7964	August 2, 1983–July (unknown) 1984	61-7974
October 16–November 2, 1978	61-7964	September 9, 1983–June 12, 1984	61-7958
March 12–28, 1979	61-7972	June 14, 1984–mid-July 1985	61-7979
April 17–May 2, 1979	61-7979	July–October 16, 1984	61-7975
October 18–November 13, 1979	61-7976	October 19, 1984–mid-October 1985	61-7962
April 9–May 9, 1980	61-7976	July 19, 1985–October 29, 1986	61-7980
September 13–November 2, 1980	61-7972	October 29, 1985–January 29, 1987	61-7960
December 12, 1980–March 7, 1981	61-7964	November 1, 1986–July 22, 1987	
March 6–May 5, 1981	61-7972	(for repairs)	61-7973
16 August 16, 1981–November 6, 1981		February 5, 1987–mid-March 1988	61-7964
(Arrived from Bodø; diverted on flight		July 27, 1987–October 3, 1988	
from Beale AFB on August 13)	61-7964	(from RAF Lakenheath)	61-7980
December 16–21, 1981	61-7958	March 13, 1988–February 28, 1989	61-7971
January 5–April 27, 1982	61-7980	October 5, 1988–January 18, 1990	
April 30–December 13, 1982		(to RAF Lakenheath)	61-7964
(at Bodø May 7–9)	61-7974	March 2, 1989–January 19, 1990	61-7967

nations. Blackbird missions were hazardous; more than 1,000 surface-to-air missiles were launched at the type during its operational career, most by North Vietnamese air-defence sites. None reached their targets — a testimony to an extraordinary and unsurpassed aircraft.

The SR-71 operated from Mildenhall over a period of some 16 years, 11 of which comprised regular operations, the remainder being largely ad hoc missions. Limited documentation has been released concerning SR-71 operations in Europe, but we know that more than 1,000 missions were flown, most of which were operational. Decades later, military and political figures still talk of the contribution the aircraft is capable of whenever the USA is embroiled in foreign military adventures. During the Kosovo campaign and the second Gulf War, there were calls for the reinstatement of SR-71 operations, owing to a lack of time-sensitive reconnaissance. The final death knell for the SR-71 was the advent of small, highly capable unmanned aerial vehicles (UAVs), cheap to operate and able to loiter for longer periods to obtain data. While not providing the same quantity of intelligence, they are as flexible, and are considered "disposable" owing to the lack of an onboard crew. No SR-71 advocate can argue against such advantages.

The emblem of Det 4 was a large SR-71 superimposed on a dartboard, reinforcing the cultural link between the two nations. The emblem was never displayed on the fin of an aircraft while at Mildenhall, instead being exhibited only on the sign outside the unit's hangar and within the small office complex. Each aircraft was only with the Det on a temporary duty basis, and remained

the property of the parent Wing throughout its overseas deployment, hence the lack of individual unit insignia. However, Blackbird 61-7980 had the Det 4 emblem applied to its fins in February 1990 for its delivery flight from Palmdale to nearby Edwards for service with NASA. The emblem was soon replaced with a NASA symbol.

Within the Det 4 offices at Mildenhall were several murals devoted to the SR-71 and its support units. Among these was a handwritten poem celebrating the 25th anniversary of the SR-71, based on a popular Pepsi-Cola television advertisement of the time. It read:

*"Kelly-inspirin Rich-thinkin Skunk-workin recon-
seem two-seatin intelligence-gatherin J58-drivin JP7-
burnin missile-avoidin MiG-loosin [sic] high-flyin
record-settin Mach-bustin . . . BLACKBIRD!"*

The anniversary celebrated the type's quarter-century of operational service, from December 22, 1964, to December 22, 1989. Despite the intervening three decades since the SR-71 ceased operations in Europe, the type is remembered with much fondness by those who experienced a Blackbird take-off. Legendary designer Kelly Johnson and his assistant Ben Rich have both since died, taking with them the slide-rule technology that created the SR-71 and later the F-117A. It is unlikely such technological masterpieces will again be produced using the creative genius of men of vision, computers having largely replaced the "man in the loop". They and their products may be consigned to history, but their contribution to the defence of the USA and its Nato allies is almost immeasurable.



Horrie Miller's Airco D.H.9C G-AUHT is inspected by the locals at Parafield on the outskirts of Adelaide in 1929. Miller acquired D.H.9 G-AUEU in 1925; after it crashed in 1928, Miller built G-AUHT apparently using parts of 'UEU plus new components. It is seen here before Miller modified it for the 1929 Western Australian Centenary Air Race.

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NINE'S LIVES

JUANITA FRANZI continues her series of articles on notable airframes and their markings here with the story of a hardworking — and race-winning — D.H.9 operated by Australian aviation pioneer Horrie Miller

HORATIO C. "Horrie" Miller's aviation career began in 1913, when he travelled to the UK, finding work at the Sopwith Aviation Co. After leaving the Australian Flying Corps (AFC) at the end of the First World War Miller started a number of flying businesses in Australia. Following a bruising experience operating a Curtiss Seagull flying-boat service from Adelaide during 1923, Miller took stock of his options. Passenger aircraft of the day were largely underpowered, while most ex-military higher-performance aircraft lacked space for passengers. After some consideration Miller opted for performance and, in 1924, placed an order for an Airco D.H.9. Although more modern types were to join his fleet, he kept the biplane in service for more than ten years.

Miller ordered the D.H.9, which had accrued a mere 16hr flying time, from ADC Aircraft Ltd in the UK, reportedly paying £1,300. Knowing it would take months to arrive in Australia, he picked up a job flying an Avro 504 in Queensland.

When the D.H.9 arrived in Brisbane in early 1925, Miller, an experienced engineer, set about assembling the aircraft, which was given the civil registration G-AUEU that May. The new owner was thrilled with its performance; the 240 h.p. Siddeley Puma engine gave it a speed of more than 100 m.p.h. (160km/h) at sea level.

Miller's plans suddenly changed in August 1925, when he accepted a position as an RAAF

Technical Officer. He flew the D.H.9 to Point Cook, where he met familiar faces from his AFC days. Miller offered 'UEU to the Defence Department for £950, but there was no interest and it was pushed to the back of a hangar. The return to military life soon began to pall, however, and in mid-1926 Miller resigned. Dusting down the D.H.9, he set off for Adelaide.

At some point Miller modified the aircraft for joyriding work, with the addition of a passenger position forward of the cockpit, in the space originally occupied by the bomb bay. A passenger seat was also fitted in the observer's cockpit.

In June 1926 Miller flew the aircraft to the wealthy mining town of Broken Hill, where the joyriding business was good. On one occasion a burst tyre lost him a day's flying, disappointing the waiting crowd. Determined to ensure this would not happen again, Miller permanently replaced the biplane's tyres with a pair from a motorcycle. Two months later he returned to Adelaide with £900 in his pocket.

Dividing his time between Adelaide and Melbourne, Miller performed charter flights in 'UEU and worked as a mechanic. Operating under the name Commercial Aviation Co, the business expanded to include advertising, aerial photography and medical flights.

Miller saw a future in providing scheduled passenger air services to remote rural towns. To

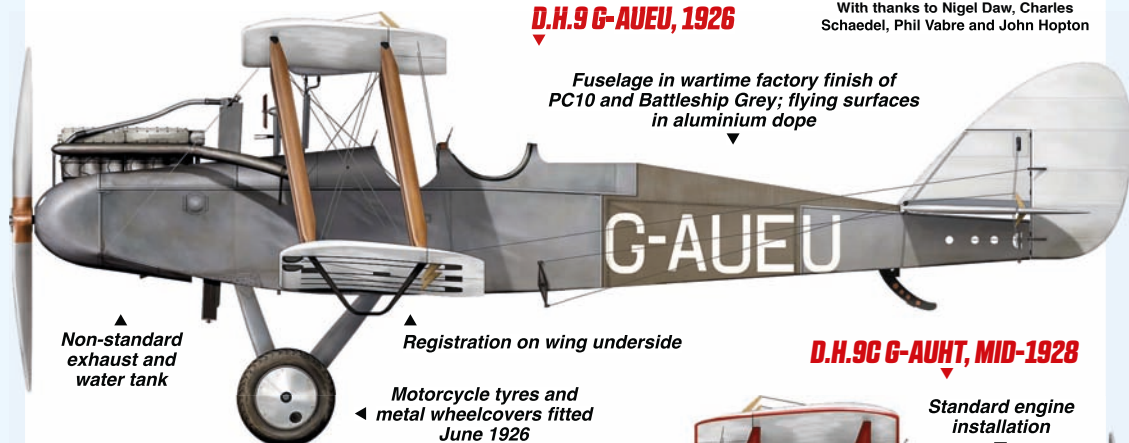
Continued on page 62

AIRCO D.H.9/9C G-AUEU/G-AUHT/VH-UHT, Horatio G. Miller, 1925–36

D.H.9 G-AUEU, 1926

With thanks to Nigel Daw, Charles Schaedel, Phil Vabre and John Hopton

Fuselage in wartime factory finish of PC10 and Battleship Grey; flying surfaces in aluminium dope



Non-standard exhaust and water tank

Registration on wing underside

Motorcycle tyres and metal wheelcovers fitted June 1926

D.H.9C G-AUHT, MID-1928

Standard engine installation



"Commercial Aviation Company" on fin

Ply-covered fuselage; aluminium dope overall with unknown colour trim*

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AERO ILLUSTRATIONS

G-AUHT, WESTERN AUSTRALIAN CENTENARY AIR RACE, SEP–OCT 1928

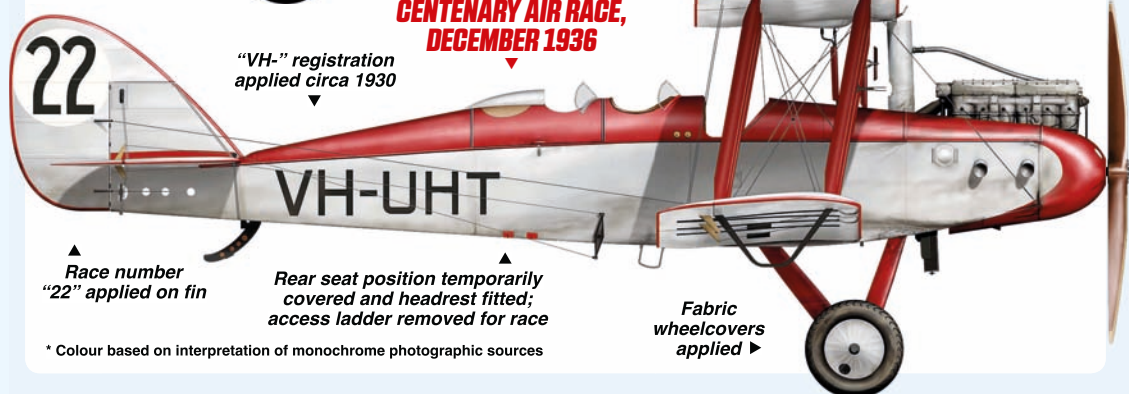
Race number "16" applied on fin



Front and rear passenger positions temporarily covered; cockpit opening reduced in size. Replacement port aileron from G-AUEU

VH-UHT, SOUTH AUSTRALIAN CENTENARY AIR RACE, DECEMBER 1936

"VH-" registration applied circa 1930



Race number "22" applied on fin

Rear seat position temporarily covered and headrest fitted; access ladder removed for race

Fabric wheelcovers applied

* Colour based on interpretation of monochrome photographic sources

Bearing race number "22", VH-UHT is seen here at Parafield at the end of the 1936 South Australian Centenary Air Race, for which the rear passenger position was faired over and a headrest was installed.

CIVIL AVIATION HISTORICAL SOCIETY /
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Continued from page 60

finance the purchase of a larger aircraft, Miller obtained the backing of wealthy confectionery manufacturer Macpherson Robertson. An order was placed with de Havilland in May 1927 for a 6–8-seat passenger aircraft which would become the D.H.61 Giant Moth. On March 2, 1928, the D.H.61 was accepted by the new company, MacRobertson Miller Aviation Co Ltd (MMA).

A few weeks later, on March 16, while returning in G-AUEU from a charter flight to Kimba in South Australia (SA), Miller was caught in a dust storm. He managed to land the aircraft but was unable to tie it down before it was blown across the paddock. His memoirs record that he ordered new parts from England and “put the aircraft together once more”, although it is unclear whether the D.H.9 that emerged from his hangar was a rebuilt G-AUEU or effectively new. Registered G-AUHT on July 26, 1928, the D.H.9 certainly looked like a new aircraft. The ply-clad fuselage was finished in a smart scheme identical to that applied to the D.H.61 by de Havilland. It could carry three passengers in a layout typical of British D.H.9C conversions.

While the D.H.61 ran regular services between Adelaide and rural towns, G-AUHT was used for charter work. In January 1929 a new D.H.60 Moth was added to the fleet and later that year a Fokker Universal arrived from the USA. Although the fledgling business kept Miller busy, he leapt at the chance to compete in the 1929 Western Australian Centenary Air Race during September–October. The race was flown over six days and took the 17 competitors 2,450 miles (3,940km) across the continent from Sydney to Perth.

Miller overhauled the D.H.9’s engine and streamlined the airframe by covering over the two passenger openings. Although it was up against more modern aircraft and carried a passenger, journalist Geoffrey Tebbutt, the D.H.9 was always among the first to finish each day’s leg, a tribute to Miller’s exceptional flying skills. When the race concluded in Perth on October 7,

Miller was announced as the winner of the £1,000 handicap prize.

By 1930 the Great Depression was beginning to bite; MMA was supported by Robertson but did not receive government subsidies. Regular services were maintained for as long as possible but falling passenger numbers eventually forced the closure of most routes and the D.H.61 was sold to West Australia Airways in 1931.

Miller continued to maintain a fleet of four aircraft; two D.H.60 Moths, the Fokker Universal and the D.H.9. Helped by the enthusiasm of his two young employees, he continued to operate some scheduled services, and also participated in an aerial circus tour of country towns, involving “bombing demonstrations” using pre-set charges in makeshift target structures. The D.H.9 was put up for sale in early 1933 but remained unsold. Things improved in 1934 when Miller secured a subsidy for his Adelaide—Whyalla service.

By now re-registered VH-UHT, the trusty D.H.9 finally caught the eye of an Adelaide syndicate, Skyways Ltd. Hoping to repeat Miller’s success of 1929, the syndicate purchased the D.H.9 and entered it in the 1936 South Australian Centenary Air Race. Starting in Brisbane, the race had three stages before reaching its final destination, Adelaide, on December 16. The aircraft, flown by syndicate members B.W. Monk and W. Maddocks and carrying an additional passenger, was heavily handicapped, being the oldest machine to compete and one of the few with such a large crew. Nevertheless, the D.H.9 was always among the last to land at the end of each day and even the handicap failed to increase its chances.

After the race, the syndicate returned the aircraft to its standard passenger configuration. However, it wasn’t long before disaster struck. On May 15, 1937, while being flown by Syd Dunstone, the aircraft crashed at Kadina, SA. Although nobody was injured, the aircraft, still bearing race number “22”, was completely destroyed, thus ending a long and fruitful career.





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Westland SCOUT & WASP

The 1957 Defence Review and subsequent British aircraft industry overhaul resulted in all the smaller helicopter companies – Bristol, Fairey and Saunders-Roe – being absorbed by Westland. These acquisitions brought existing models with them, but in practice it was only the Saunders Roe P.531 which survived to become a successful production model. Developed as the Scout for the Army and Wasp for the Royal Navy, the Scout entered service in March 1963 with 149 being built for the British Army, which deployed them very successfully worldwide, being finally withdrawn from service in March 1994. The Scout was also exported to Australia, Bahrain, Jordan and Uganda. Likewise the Wasp was a very successful navalised version of the Scout, with castor-wheeled undercarriage and folding tail boom and rotors for on-board ship deployment. It could carry two torpedoes and both the Scout and Wasp could deploy Nord AS.11/AS.12 missiles. Ninety-eight Wasps were eventually completed with exports going to Brazil, The Netherlands, New Zealand, Indonesia, South Africa and Malaysia. The Wasp was finally withdrawn from Royal Navy service in 1988, when it was replaced by the Lynx. Author Adrian Balch takes you through the history and

development of these much-loved helicopters in the first single source book to be published on the types including the original Saro P.531 prototypes, with nearly all colour photographs depicting every colour scheme and markings worn by both types. Once again artist Richard Caruana enhances the publication with his accurate profile drawings making this the definitive source on the Scout and Wasp for modellers and aviation historians alike.

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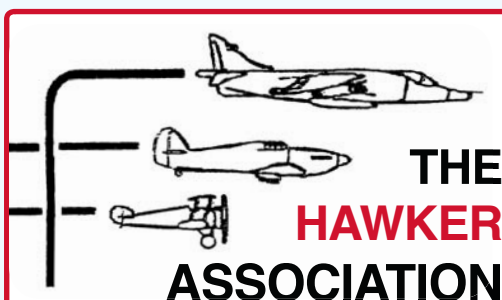
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RIGHT A Vought Corsair IV of No 1846 Sqn aboard HMS Colossus in 1945. The unit had received the variant — built by Goodyear at Akron, Ohio — that February, before embarking in the carrier for the Far East. Several of the Corsairs ferried to Ceylon by air went on to serve with No 1846 Sqn, although the unit saw no action in the Pacific.



With the tide of war in Europe turning decisively in favour of the Allies by late 1944, the Royal Navy turned its attention to the defeat of Japan in the Pacific, where state-of-the-art carrier aircraft would be needed — and fast. **RAY FLUDE** describes how the RAF and Fleet Air Arm co-operated to deliver Hellcats and Corsairs over a 5,600-mile air route from the UK to Ceylon

THE OVERWHELMING strength of the air transport network developed by the Allies since the onset of the Second World War supported collaboration on strategy between Britain, the USA and USSR by enabling face-to-face discussions between political and military leaders (see the author's article *The Molotov Express* in *TAH14*). Just as importantly, the network also supported the sharing of technology and the movement of weapons, particularly the delivery of aircraft by air.

THE VITAL FERRY ORGANISATION

The organisation for ferrying replacement aircraft overseas by air from Britain, operated by the RAF's No 44 Group, was outstandingly successful in building up the strength of the air forces in the Mediterranean, Middle East and India, and helped to achieve the air supremacy which won the war. By the end of 1944 the Group had gone through a number of reorganisations. Separate units responsible for preparing aircraft for the long journeys and readying crews to fly them had been streamlined into just three Ferry Units (FUs):

- No 1 FU at RAF Pershore;
- No 11 FU at RAF Talbenny;
- No 12 FU at RAF Melton Mowbray.

Between them these units handled all aircraft being ferried overseas. Earlier in the war many of the aircraft had been flown out by reinforcement crews drawn from the Operational Training Units of the separate Commands — Fighter, Bomber and Coastal — which would be using



Commissioned on April 2, 1945, HMS Glory embarked the Fairey Barracudas of No 837 Sqn and the Corsair IVs of No 1831 Sqn before sailing for the Far East to become part of the British Pacific Fleet. A number of the air-ferried Corsairs joined No 1831 Sqn in theatre, but none saw action. Glory is seen here with Fairey Fireflies and Corsairs on the deck in January 1946.

STATE LIBRARY OF VICTORIA

the machines in the theatre of operations to which they were being delivered. But by 1944 the squadrons overseas were generally up to strength, and most of the aircraft were being flown out by specialist ferry pilots who delivered the aircraft before being flown back to their departure base in Britain to take out the next delivery.

By this time the network of staging posts (SPs) supporting air deliveries stretched across the world, and from September 1944 aircraft could be delivered across France to the Mediterranean for the first time since June 1940. Establishing routes for single-engined aircraft across France took more time, and the first group of Supermarine Spitfire Vbs to use such a route was delivered to Bordeaux in January 1945. Once this was in place dozens of Spitfire IXs and North American Mustang IVs followed on the direct route to the Mediterranean. Taking the lead in delivering single-engined aircraft was No 12 FU. After a series of accidents in the early part of the year all of these deliveries were made in convoy, with a group of single-engined aircraft led by a twin-engined type with a navigator.

At the end of 1944 it was clear that the war in Europe was drawing to a close. Germany was now fighting on two fronts against overwhelming odds and would almost certainly fall in the next six months. But it was expected that the war in the Far East would take another 18 months, until the end of 1946, to bring about victory, and this might well require a bloody opposed landing on the Japanese home islands.

THE BRITISH PACIFIC FLEET

For political reasons the UK Government wanted to be sure that Britain played a significant role in the ending of the war with Japan, although the fighting in the Pacific until this point had

been undertaken largely by the Americans. It was important for Britain's post-war place in world affairs that the Royal Navy should become involved. The senior service was also keen to participate in, and learn from, the sophisticated tactics the Americans had developed in their use of carrier-based task forces and aircraft over very long distances. Churchill offered the participation of a British Fleet in the Central Pacific at the Quebec Conference in September 1944. The offer was accepted by President Roosevelt, although Admiral Ernest King, Commander-in-Chief of US Naval Forces, expressed some reservations about the contribution the Royal Navy could make.

The British Pacific Fleet (BPF) began to form in November 1944 and, along with putting together a fighting force, was tasked with creating a fleet train, comprising tankers, repair ships, tenders and floating docks, which could establish a mobile base in any secure anchorage and send supply ships to replenish the fleet without having to return to Australia. The US Fifth Fleet had developed this kind of support force during its advance on Japan across the Pacific, far from fleet bases. The British naval contribution, if it could be made to work, would still be dwarfed by the size of the American fleets in the Pacific. Task Force (TF) 58, the American Fast Carrier Group, would, on its own, be larger and more powerful than the whole BPF. During July–August 1945 TF 58 included 16 carriers and 1,190 carrierborne aircraft, while the BPF, identified as TF 57, would include just four carriers and 255 aircraft.¹

The BPF adopted American communications systems and conventions to avoid confusion, and also adopted some types of American carrier aircraft, notably the Grumman F6F Hellcat, TBM/TBF Avenger and Vought F4U Corsair. There were arguments for this based on the compatibility of

Corsair II JT633 of No 1834 Sqn wears the FAA's distinctive Far East American-style insignia with bars applied either side of the dark blue roundel without the red "meatball" in the centre, so as to avoid confusion with the red hinomaru ("sun-circle") markings on Japanese aircraft. The "P" on the fin denotes that the aircraft was operating from HMS Victorious, which joined the British Pacific Fleet in November 1944.



equipment, but also based on suitability. Until 1937 the RAF had controlled the procurement of aircraft for the Royal Navy and there was still a legacy of types in service adapted from successful land-based aircraft rather than being specifically designed for use on aircraft carriers. Some of these land-based types had undercarriages too fragile to cope with intensive use on carrier decks and too short a range to be able to undertake effective air strikes. American naval types had already been brought in to British service earlier in the war and some had served on carriers in northern waters.

The aircraft of the BPF wore a special Pacific roundel to avoid friendly-fire incidents. This had a white centre within a blue circle with a white edge and on either side white bars with blue edges. There was no red in the markings to ensure there was no confusion with Japanese markings.

The British East Indies Fleet was also being strengthened at the same time in order to support the retaking of Burma and Malaya, and the same types of American aircraft were used on the aircraft carriers in the Indian Ocean.

TO THE PACIFIC BY AIR

Units of the new BPF left Trincomalee on Ceylon (now Sri Lanka) in December 1944 for Australia and, on the way, during January 1945, performed a series of air strikes against important oil installations and refineries on Sumatra. These actions showed that the BPF could expect a high level of aircraft losses from accidents as well as combat and that a good supply of replacement aircraft would be needed.² The BPF arrived in Australia in early February 1945.

The usual process for Fleet Air Arm (FAA) squadrons re-equipping with American types was for the pilots to meet up with their aircraft

at depots in New England in the USA. After familiarisation and training, the whole unit would be shipped on an escort carrier to the UK to join aircraft carriers going out to the Indian Ocean. But planning was already under way to get an additional stock of replacement aircraft delivered rapidly to India and Australia. On January 25, 1945, a conference was held between the Admiralty, HQ Transport Command and senior officers of No 44 Group, to look at the air delivery of the Admiralty Commitment, the rate of flow and the preparation requirements for this, to be handled by No 12 FU at Melton Mowbray.³

The Admiralty chair of the conference, Capt Philip Welby-Everard, was concerned that sample aircraft had not yet arrived at No 12 FU for familiarisation purposes and wanted urgent action. The three types concerned in the delivery by air would be the Grumman Hellcat II and Vought Corsair IV fighters and Vultee Vengeance IV target tug. There were 14 Hellcat IIs already with No 41 Group, which looked after aircraft supplies, waiting to be flown to No 12 FU, and the plan was to ferry out 30–35 aircraft per month, up to a total of 140, with more dependent on supplies arriving from the USA. The Vengeance was likely to arrive next, the aim being to ferry out 20 per month up to a total of 80. The Corsairs might not start to flow until April 1945 or later.

It was pointed out during the conference that the Hellcats did not have an air-cleaner fitted and that it would be necessary to provide a cover for the air intake. This would mean changing the oil every 15 flying hours and the staging posts would need to know this. No long-range tanks would be fitted because the ferrying stages would be so short, but specialist ground-handling equipment would be needed at the FU and at RAF Portreath in Cornwall, home to No 1 Overseas Aircraft

Originally built as a two-seat dive-bomber (and employed in that role by the RAF in Burma from early 1943) the Vultee Vengeance was used by the Royal Navy's Fleet Requirements Units, Nos 721 and 733 Sqns, as a target tug. Vengeance IV HB484 is seen here with the yellow-and-black stripes the type wore for the latter role.

PHILIP JARRETT COLLECTION

Despatch Unit, which was the principal exit-point for aircraft flying overseas.

The first ten Vengeances were expected to arrive in February and would also not have long-range tanks. It was possible they could be flown out already painted in yellow-and-black stripes to show that they were target tugs, but it would be necessary to check that this would be acceptable in the flight across France.

THE HELLCATS

A look at the delivery of the Hellcat IIs shows how the process worked. The type was manufactured in the American state of New York, the aim of the design being to produce an aircraft which would outclass Japan's Mitsubishi Zero in all ways: a higher maximum speed; greater range; a more robust structure; a powerful Pratt & Whitney Double Wasp engine and a standard armament consisting of six 0.5in machine-guns with 400 rounds per gun. The Hellcat I (equivalent to the US Navy's F6F-3) had been in use by the FAA from June 1943 and the Mk II (F6F-5) was first delivered to Britain after May 1944.

Fleet Air Arm pilots liked the Hellcat, as one remembered in John Winton's 1969 book *The Forgotten Fleet*: "I recall [its] extreme reliability as well as [its] great flexibility for attacking anything, from a high CAP [Combat Air Patrol — protecting the fleet], right through the machinations of ground-attack by gun and rocket".⁴

The completed aircraft intended for ferrying to the Far East from No 12 FU were shipped to the UK on escort carriers. At least 16 Hellcat IIs bound for Melton Mowbray were embarked in *HMS Ruler*; the latter, after leaving Norfolk, Virginia, on October 24, 1944, picking up the aircraft in New York on November 7, arriving at Greenock on the Clyde on November 18 as part of Convoy CU46.⁵ There would have been many more aircraft from the same consignment aboard but, unlike the aircraft of the RAF, there are no surviving recorded histories of individual wartime naval aircraft.⁶ What is available has been assembled by researchers from many different sources and there are understandably many gaps.

There was still an element of danger attached to these crossings, although the Battle of the Atlantic

BELOW In total, some 1,182 Grumman Hellcats were supplied to the Royal Navy by the USA under Lend-Lease arrangements, divided into 252 Hellcat Is and 930 Hellcat IIs. The type entered Fleet Air Arm service with No 800 Sqn in July 1943, first seeing action during anti-shipping strikes off the Norwegian coast in December 1943.

PHILIP JARRETT COLLECTION





had effectively been won by the Allies by late 1944. One of *HMS Ruler's* sister ships, *HMS Thane*, also delivering a cargo of aircraft, was torpedoed at the mouth of the Clyde a few days later and was so severely damaged that it had to be scrapped. On arrival in the UK the Hellcats were taken to the Lockheed workshops at Renfrew, near Glasgow, which specialised in working with American aircraft types and performed any re-assembly or cleaning up needed.

On February 19, 1945, an Air Movement Order was sent to No 12 FU to Commitment 199, relating to the delivery of the Hellcat IIs. The interim destination was Cairo West (SP 10), and the ultimate destination was Coimbatore in what is now the Tamil Nadu province of India. The order specified 75 aircraft to be delivered. Fuel-consumption tests undertaken by No 12 FU showed that the Hellcat II's safe range was just 490 nautical miles (908km). The aircraft had been weighed for the tests, fully equipped with six 0.5in Browning machine-guns and ammunition and a full set of safety equipment, comprising dinghy, parachute, signal pistol and cartridges. There were also bags of spares, covers for the aircraft, 1,500lb (680kg) of fuel and 139lb (63kg) of oil. The order explained that the "first two or three aircraft will be delivered to Bilbeis [near Cairo], where No 44 Group crews will help in familiarising the crews from No 216 Group in handling the Hellcat aircraft". The latter Group would provide the ferry pilots for the next stage.⁷

The aircraft were flown into Melton Mowbray from Renfrew from early February 1945 by civilian pilots of the Air Transport Auxiliary (ATA). Two aircraft flown by ATA pilots had accidents on the way, one hitting a flock of birds on take-off on February 13, the other being written-off on March 30 after the undercarriage collapsed on landing.⁸

ABOVE *With full flap selected and arrestor hook trailing, a Hellcat II prepares to take a wire while operating with a carrier of the British Pacific Fleet. A nimble fighter capable of taking on the best Japanese fighters on its own terms, the Hellcat soon proved to be an invaluable addition to the FAA's inventory in the Far East and Pacific theatres of combat.*

On arrival at Melton Mowbray the Hellcats were tested and prepared to the weight specification and flown out by ferry pilots. Each stage had to be less than 560 miles (900km) and the first part of the route was Portreath—Rennes (SP 93)—Blagnac-Toulouse (SP 138)—Istres (SP 103), north-west of Marseille. The aircraft then followed the single-engined route from Elmas (Cagliari — SP 63) to El Aouina (Tunis — SP 76). From there they were placed under the direction of No 284 Wing based at Algiers, part of No 216 Group, and were allocated a new pool of ferry pilots. The route from Tunis continued to Castel Benito-Tripoli (SP17) to El Adem (SP 12) near Tobruk, and on to Cairo West (SP 10).

The movement of aircraft within the Mediterranean and Middle East areas and on the route to India was controlled by No 216 Group, which controlled all of the SPs in the area and had its own ferry units of specialist pilots. The ferrying of aircraft arriving in West Africa, as well as those moving onwards from Cairo to India, was looked after by No 5 FU.

In March 1945 No 216 Group began to receive the Hellcats at Cairo, and the first three aircraft went to No 1330 Check & Conversion Unit at Bilbeis, as agreed, where 30 pilots underwent conversion training. Delays held the aircraft at Cairo West, as the solid tailwheel tyres on the aircraft had deteriorated on the flight out and there were no spares immediately available. There was also a lack of suitable twin-engined



aircraft, which could act as convoy leaders, making the same journey from Cairo to India.⁹ The first convoy of four Hellcats, led by a Bristol Beaufighter, left Cairo on March 12 and arrived at Coimbatore on the 18th. The following month there were six convoys of Hellcats, three led by Beaufighters and three by Martin Baltimores.¹⁰

At least 124 Hellcats left Melton Mowbray for India, some aircraft taking 30 days to make the journey. (Some confusion with the recording of the aircraft's serials makes it impossible to confirm the exact number.) This was still much faster than the journey by sea, but there were losses of pilots and aircraft on the way. Between Cairo and India, the ferry pilots of No 5 FU flew an accumulated total of more than 300,000 miles (483,000km) to deliver the Hellcats. The convoys followed the North Arabian route to the north of the Persian Gulf, arriving in the sub-continent at Karachi using some of the following staging posts: H3 (SP 41); Habbaniya, Iraq (SP 40); Shaiba, Iraq (SP 42, south-west of Basra); Jiwani, 430 miles (690km) west of Karachi, India (SP 45) and Mauripur (now Masroor Airbase), near Karachi (SP 48).

From there the route continued via Hakimpet (SP 39), near Hyderabad, to Coimbatore in southern India (often using the staging post at Sulur, east of Coimbatore) before ending at Trincomalee, the main naval base on Ceylon. From there the Hellcat IIs either joined the East Indies Fleet or the newly-established BPF. A few arrived in March 1945, the rest arriving in India over the following five months.

At least 13 of the air-ferried Hellcats joined the FAA's No 800 Sqn aboard *HMS Emperor* (D98), an escort carrier with the East Indies Fleet in the

Indian Ocean. Some of the aircraft were probably engaged in strikes against Rangoon in May 1945, against the Nicobar Islands in July and, after VJ-Day on September 2, involved in covering the reoccupation of Singapore. Two of the air-ferried Hellcats, JX753 and JX766, crashed while making deck landings in June.

JOINING THE FLEETS

At least ten of the air-ferried Hellcats joined No 896 Sqn in Ceylon aboard *HMS Ameer*, another escort carrier with the East Indies Fleet which took part in similar operations. Some of these aircraft were probably engaged in strikes against the Nicobar Islands in July. Unfortunately, one of the air-ferried Hellcats, JX878, was shot down by friendly fire. Up to a dozen more of the air-ferried aircraft were scattered across the East Indies Fleet in smaller numbers on other escort carriers.

An example of the kind of deck-landing accident which intensified the need for replacement aircraft occurred aboard *HMS Ameer* on May 28, 1945, when five aircraft were seriously damaged in one incident. Hellcat JW723 bounced on landing, missed all the arrester wires and broke through the barriers into the aircraft park at the end of the flightdeck. That aircraft was written off, as was air-ferried Hellcat JX827, which had left Melton Mowbray on February 27. Three others were also seriously damaged.

To provide replacement aircraft for the BPF, some of the Hellcats were taken on to Australia by sea, a further 5,000 miles (8,045km), and then on again towards Okinawa, either on a fleet carrier assigned to a squadron or on an aircraft ferry carrier, which would replenish stocks at

Hellcat II JX715 of 896 Sqn, coded B-8V, has its engine run up aboard HMS Empress on August 28, 1945. Having sailed from South Africa to Ceylon aboard HMS Ameer in April, the unit remained in the Indian Ocean with the East Indies Fleet, undertaking fighter sweeps and bombing strikes on the Nicobar Islands and Phuket in Thailand that July.



sea between operations. For some aircraft the journey from manufacturer to combat theatre now covered more than 17,000 miles (27,350km).

At least two of the air-ferried Hellcats joined squadrons on the large fleet carriers which went into action for the first time supporting the American Pacific Fleets off Japan. The units were Nos 1839 and 1844 Sqns embarked in *HMS Indomitable*.¹¹ In April 1945 the Fleet was taking part in its first operation with the Americans, who were preparing for landings on Okinawa.

The British aircraft carriers were positioned to intercept any attacking aircraft operating along the Sakashima-guntō chain of islands towards Okinawa from airfields on Formosa (now Taiwan). The BPF was attacked frequently by kamikaze aircraft while taking part in these operations, its Hellcats often being called into action. One, JX762 (not one of the air deliveries) from No 1844 Sqn, shot down an attacking Yokosuka D4Y *Judy* 100 miles (160km) off Nansei-shotō (the Ryukyu Islands) on April 6. Two weeks later the same Hellcat was damaged when landing on its carrier.

HMS Ruler (D72), one of the escort carriers that had transported the Hellcats across the Atlantic in November 1944, now operated within the BPF, providing immediate replacement aircraft. Between operations the BPF withdrew to replenishment areas and met up with the fleet train tankers and other escort carriers acting as aircraft ferries. As well as carrying replacement aircraft *Ruler* also provided defensive combat air patrols (CAPs) while the fleet refuelled. The carrier was one of the few British ships in Tokyo Bay in September 1945 to witness the formal surrender of Japan.

AT LEAST 161 FAA Hellcat IIs and Corsair IVs were ferried by air to the Far East during February—August 1945. Their serials are listed below in alphanumeric order.

Grumman Hellcat IIs

JV223; JV224; JV233; JV238; JV242; JV245; JV246; JV254; JV261; **JV270 (recorded twice as despatched; actual Hellcat despatched unrecorded)**; JV280; JV281; JV286; JV287; JV289; JW717; JX691; JX731; JX737; JX740; JX742; JX744; JX746; **JX748 (recorded twice)**; JX749; JX751; JX752; JX753; JX755; JX765; JX766; JX769; JX771; JX773; JX775; JX777; JX779; JX781; JX782; JX784; JX786; JX787; JX788; JX790; JX791; JX795; JX796; JX797; JX798; JX799; JX800; JX804; JX812; JX816; JX818; **JX820 (recorded twice)**; JX821; JX824; JX825; JX826; JX827; JX828; JX830; JX831; JX833; JX836; JX837; JX838; JX840; JX841; JX842; JX843; JX844; JX845; JX846; JX848; JX852; JX853; JX855; JX856; JX858; JX859; JX861; JX862; **JX863 (recorded twice)**; JX864; JX865; JX866; JX867; JX868; JX871; JX872; JX873; JX875; JX877; JX878; JX879; JX880; JX881; JX894; **JX896 (recorded twice)**; JX898; JX900; JX903; JX909; JX930; JX933; JX934; JX935; JX940; JX941; JX942; JX946; JX949; JX951; JX953; JX954; JX955; **JX957 (recorded twice)**; JX958; JX959; JX962; JX963; JX964

Vought Corsair IVs

KD162; KD169; KD179; KD182; KD184; KD187; KD195; KD196; KD197; KD200; KD207; KD216; KD219; KD232; KD269; KD301; KD340; KD346; KD375; KD386; KD397; KD405; KD411; KD414; KD433; KD442; KD449; KD451; KD459; KD493; KD589; KD610; KD750; KD763; KD769; KD775; KD782



ABOVE A trio of No 1846 Sqn Corsair IVs over Cape Town in South Africa, with the majestic Table Mountain as a backdrop, during the refit of HMS *Colossus* at Simon's Town in January 1946. Corsair "117" is KD750, one of the 37 air-ferried to the Far East in the first half of 1945. The unit was disbanded on its return to the UK in July 1946.

The Corsair IV (equivalent to the US Navy's Goodyear-built FG-1D), first delivered to the Royal Navy in August 1944, was manufactured in Ohio and delivered to New England, the type entering service on Royal Navy carriers before it had even been accepted by the US Navy. It was fitted with the powerful Pratt & Whitney Double Wasp engine and proved to be a valuable fighter and excellent ground-attack aircraft, armed with four 0.5-in machine-guns and able to carry a full load of bombs or rocket projectiles.

CORSAIRS AND VENGEANCES

At least four of the Corsairs delivered by No 12 FU were on the same Atlantic crossing by HMS *Ruler* as the Hellcats referred to above.¹² An Air Movement Order, dated February 26, was to Commitment 1027, which mirrored Commitment 199 for the Hellcat IIs and specified that the aircraft were to be delivered via France to Fayid, west of Cairo.¹³

The Corsairs began to arrive at Melton Mowbray in February 1945, and despatch began in March, having been held back, according to the No 44 Group monthly reports, by a lack of spares, a common problem with the introduction of American types. This date was still ahead of the April target discussed with the Admiralty in January. Again this was a project undertaken by ferry pilots and the route was the same as that used by the Hellcats, with the end point identified as Coimbatore.

A total of 37 Corsairs left Melton Mowbray for India, at least 14 of which were spread among the

squadrons on the four light fleet carriers of the BPF. None saw action, however, most arriving in Australia in June 1945, ready for the next phase of a war which was, as it turned out, almost over. The aircraft joined No 1846 Sqn on HMS *Colossus* (R15), No 1831 Sqn on HMS *Glory* (R62), No 1850 Sqn on HMS *Vengeance* (R71) and No 1851 Sqn on HMS *Venerable* (R63).

The third aircraft in the Admiralty Commitment was the Vultee Vengeance IV target tug. Only 14 of these were received at No 12 FU before the end of the war, and most of them became unserviceable on the flight out to the Far East. According to a No 216 Group report, the first FAA Vengeance target-tugs had arrived from No 12 FU in April, but the aircraft was causing problems. The following month Vengeance pilot conversion training in Cairo was abandoned because the aircraft were unserviceable.

All the American aircraft had been supplied to Britain by the USA under the provisions of Lend-Lease arrangements, which President Roosevelt had explained in these terms:

"The United States should loan what articles [are] needed, as a man would loan his garden hose to help his neighbour put out a fire without reference to payment, but with the expectation that the hose would be returned [when the fire is out]".¹⁴

When the war was over, Britain had either to purchase the aircraft or return them to the USA. Deliveries under this arrangement had been phasing down after the end of the war in Europe. Only naval aircraft were sent from the USA



ABOVE A detachment of No 1851 Sqn Corsairs from HMS Venerable was sent ashore during the Allied occupation of Hong Kong in late August 1945. The FAA's Corsairs had their wings clipped by 8in (20cm) on each side in order to accommodate the type with its wings folded upwards when stowed on the Royal Navy's carrier hangar decks.

from then on and the scheme finished almost immediately after the war against Japan was won in August/September 1945. Because the war had ended so unexpectedly after the dropping of the atomic bombs, aircraft production was still running in the USA, and there were already surplus aircraft Stateside waiting to be scrapped. Thus there was little desire to have the British aircraft returned; yet the British could not afford to pay for them. Aircraft which could have provided the nucleus of a British airline service definitely had to be returned, including the Douglas C-54 gifted to Churchill for his own use. The American aircraft in use with the BPF were no exception and had to be taken out of use. Accordingly, they were pushed off the aircraft carriers where they were. For example, Hellcat II JX821, one of the first batch flown from Melton Mowbray on February 24, was unceremoniously dumped into the sea from *HMS Colossus*, despite all the effort made, risks taken and lives lost to deliver it.

OVER THE SIDE

Most of the aircraft which had survived ferrying and combat were dealt with in the same way and hundreds of FAA Corsairs were pushed overboard into Moreton Bay off Brisbane. It is estimated that more than 300 carrier aircraft, worth some £6m, were loaded on to escort carriers and dumped into the sea before they entered the Suez Canal.¹⁵ Late deliveries to the UK were dumped into the sea off Renfrew. No records of the serial numbers of these aircraft appear to have been kept.¹⁶

An eyewitness, David "Bim" Wells, described

his experience sailing back towards the UK aboard *HMS Indefatigable* in February 1946, calling at Cape Town, where 70 brand-new Hellcats were loaded aboard, together with replacement engines in big wooden crates. Halfway up the coast of West Africa he watched as holes were knocked in the aircraft's wings so they would sink. All 70, plus the replacement engines and tool kits, were then pushed over the side.¹⁷



- 1 Winton (John); *The Forgotten Fleet: The Story of the British Pacific Fleet, 1944-5* (Michael Joseph Ltd, 1969), p342
- 2 Winton, *ibid*, p97
- 3 No 44 Group ORB Appendices, January 1945; The National Archives (TNA) ref AIR25/641
- 4 Winton, *op cit* p65
- 5 Hellcat II serials JX842, JX843, JX844, JX846, JX848, JX853, JX858, JX863, JX864, JX865, JX867, JX868, JX872, JX873, JX877 and JX878
- 6 Sturtivant (Ray), Burrow (Mick); *Aircraft of the Fleet Air Arm 1939-45* (Air-Britain, 1995) p6
- 7 AIR25/641 *op cit*
- 8 ATA Accidents Committee monthly returns; TNA ref AVIA27/13
- 9 No 216 Group ORB and Appendices 879-886; TNA ref AIR25/869
- 10 No 5 Ferry Unit ORB; TNA ref AIR29/454
- 11 Hellcat II serials JX742 and JX779
- 12 Corsair IV serials KD346, KD493, KD589 and KD610
- 13 No 44 Group ORB Appendices, *op cit*
- 14 Franklin D. Roosevelt, December 17, 1941
- 15 Pearcy (Arthur), *Lend-Lease Aircraft in World War II* (Airlife, 1996), p106
- 16 For FAA aircraft histories see Sturtivant and Burrow, *op cit*
- 17 Wells, David Roy "Bim", Imperial War Museum, Sound Archive 29054, reel 12

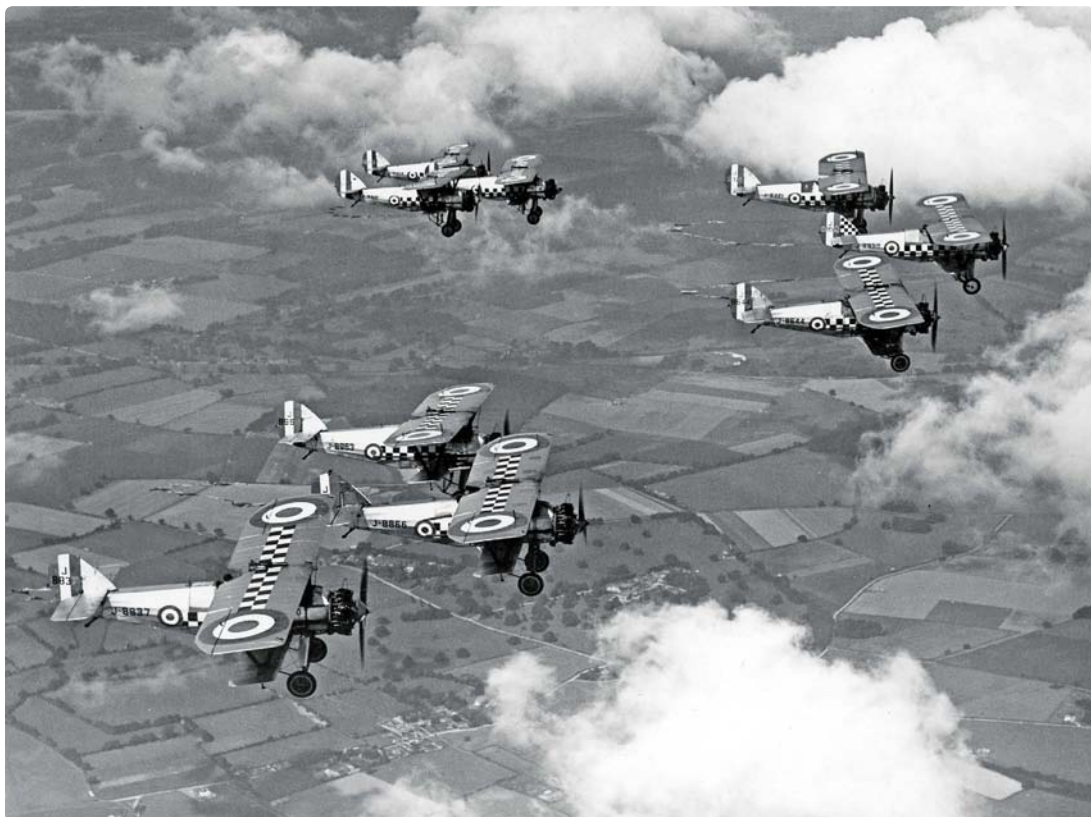


THE HORNET DILEMMA

THE FINAL FATE OF THE HAWKER FURY PROTOTYPE

A recent chance discovery of two RAF pilots' accounts of a mid-air collision in April 1930 involving Hawker's latest fighter prototype prompted **PHILIP JARRETT** to look further into what actually happened to the sole Hawker Hornet, progenitor of the Fury — which, it transpires, could not possibly have taken part in a 1931 sales tour of the Balkans, as previously alleged in at least one reputable source





IT IS VERY easy to accept statements in history books unquestioningly if you have no reason to doubt them, but sometimes information crops up unexpectedly from another source that throws things awry. This happened to me recently regarding the Hawker Hornet, the prototype of one of the most elegant of the inter-war biplane fighters, the Hawker Fury.

In his classic volume *Hawker Aircraft since 1920* (third revised edition, Putnam, 1991) the late Francis K. Mason states several times in the main text that, after completion of its manufacturer's and service trials in 1930, Hawker test pilot Flt Lt P.W.S. "George" Bulman took the Hornet on a tour of the Balkan countries in 1931, during which he made an especially successful visit to Yugoslavia that resulted in the country placing orders for the Fury.

I saw no reason to query this until, quite by chance, I came across something that cast doubt upon this episode. It emerged in a book published by parachute manufacturer Irving Air Chute of Great Britain Ltd in 1933, entitled *International Caterpillar Club 1925-1933: Lives*

saved by the use of Irvin Air Chutes. (The British company appended a "g" to the end of its name; hence the two different spellings.) At the front of this book is a chronological list of those who had saved their lives by using Irvin Air Chutes; the remainder of the book comprises descriptions of the circumstances of the emergency jumps, often based upon letters written to the company by the "jumpers" themselves when applying for the parachute maker's famous and exclusive gold Caterpillar Badge.

HORNET VERSUS SISKIN

Entry No 88 describes the experience of Plt Off J. Heber Percy of 43 Sqn RAF, based at Tangmere in Sussex. On April 11, 1930, Percy was flying an Armstrong Whitworth Siskin IIIa fighter in "an aerial fight" with Fg Off H.S. Brake of No 1 Sqn, who was in the Hawker Hornet, which was on the base for Service tests. After a time Percy lost sight of the Hornet, which was below his aircraft, and he continued in a climbing turn "in the hope of catching sight of it again". Suddenly he felt something hit the underside of his Siskin, which immediately began to vibrate very badly. The

OPPOSITE PAGE The sole Hawker Hornet at Martlesham Heath during its official trials, bearing its military serial, J9682. The original print bears the date February 10, 1930, on the back. **ABOVE** Armstrong Whitworth Siskin IIIa fighters of No 43 Sqn up from RAF Tangmere in August 1930. They would be replaced by Hawker Furies in 1931.



ABOVE A typical Siskin IIIa, J8954 was built under subcontract by Gloster Aircraft Co Ltd and served with No 41 Sqn from February 1928. The engine was a 450 h.p. Armstrong Siddeley Jaguar IV air-cooled radial. Although a rugged and dependable fighter, the Siskin lacked streamlining when compared to the Hornet/Fury, as is obvious here.

top wing of the Hornet had hit his propeller and undercarriage, leaving part of the wing structure on the Siskin's undercarriage. (It is perhaps worth mentioning that the Hornet's wing was a composite structure, with wooden ribs built around Hawker "dumbbell"-form metal spars, the whole being fabric-covered.)

Unfastening his seat straps, Percy baled out "as quickly as possible", and very soon felt the tug of his opening parachute. Looking around, he saw Brake below him, also descending beneath his open parachute. Both Percy and Brake alighted safely in fields.

Entry No 89 in the book recounts Brake's experience. He said that, as things happened so quickly, it was difficult to remember the exact sequence of events in the case of his escape, and there were apparently no eyewitnesses of the event. Brake said that he was flying "an experimental high-speed interceptor fighter — the Hornet — and was engaged in air fighting practice with the Siskin piloted by Plt Off Heber Percy". At an altitude of about 3,000ft (900m) Brake lost sight of the Siskin, and Percy apparently lost sight of the Hornet; and the two fighters "came into collision". Although Brake saw the Siskin a moment before the collision it was too late to avoid it.

The Hornet's starboard upper wing struck the Siskin's undercarriage, "tearing the wing completely away", and the Hornet immediately went into a right-hand spin. Brake undid his harness and struggled out, but as he was emerging the port wing folded back and struck

him. He managed to get clear of the aircraft, but continued to fall with the wreckage and was struck by the tailplane.

Once he found himself entirely clear of the aeroplane he pulled his ripcord and the parachute opened immediately. By then he was quite low, at about 600–700ft (180–210m), so he tried to get hold of the shroud lines above his head in readiness for the landing, but found his left arm useless and could not move it. He alighted without mishap, and found that his left arm was broken close to the shoulder, and that he had also sustained cuts to his face. He stated that he had been unaware of receiving these injuries while getting out of the aircraft, but that this was doubtless when they were inflicted.

Brake saw Percy still descending by parachute, and he made a successful landing about 200yd away. Although Brake had previously made three practice jumps, one a "pull-off" from the wing of a large aircraft and two "live" drops, this was the first occasion on which he had needed to use a parachute to save his life.

The Air Ministry issued an official statement describing the collision, and the event was confirmed in the August 29, 1930, issue of British weekly magazine *Flight*, where the two pilots' escapes are included in a list of RAF "Caterpillars". Further information appears in the Air-Britain publication *Royal Air Force Aircraft J1-J999 and WW1 Survivors* (Air-Britain, 1988), in which the Siskin is identified as J9359. This Vickers-built machine was taken on charge on March 28, 1929, and served with No 17 Sqn



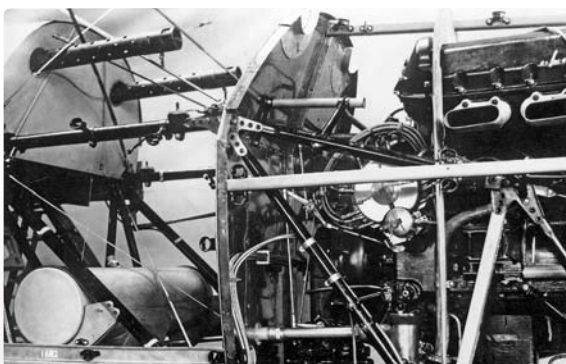
ABOVE The Hawker Hornet at Brooklands in 1929, shortly after completion, with RAF insignia but lacking a military identity. Its careful streamlining, greatly helped by the choice of a water-cooled inline engine, made it an exceptionally elegant design for the time, later further enhanced by the addition of wheel fairings, or "spats".



ABOVE The Hornet makes a low pass while being demonstrated at Brooklands in July 1929, probably with Hawker test pilot P.W.S. "George" Bulman at the controls. Designer Sydney Camm apparently got it right first time with the Hornet, which was built as a private venture, as few alterations were made in the production version, the Fury.



ABOVE A poor-quality but rare snapshot of the Hornet at Tangmere in 1930 during the Service trials and shortly before the aerial collision with a Siskin during a mock combat that put an end to its career. Fortunately its pilot, Fg Off H.S. Brake, was able to bale out, escaping with a cut face and a broken arm, having been struck by parts of the airframe during his descent.



RIGHT A close-up of the Hornet's forward fuselage, showing the rear of the Rolls-Royce engine to the right and the bay immediately ahead of the cockpit, with the barrels of the twin Vickers Mk III machine-guns pointing towards the front of the machine. Provision was made for 600 rounds per gun. The production Fury would retain the same armament.

BELOW Another view of J9682 on a rainy day during its performance and handling trials at the A&AEE at Martlesham Heath, also dated February 10, 1930. The metal-panelled forward fuselage and fabric-covered rear fuselage are evident, as is the underfuselage radiator housing between the undercarriage legs.





ABOVE *It has been suggested that the Hawker Norn, the prototype for the Nimrod naval single-seat fighter, might have been used as the demonstrator during the 1931 Balkan tour, but this seems unlikely, as it was heavily involved in Fleet Air Arm trials by that time. The Norn is seen here in November 1930 during its A&AEE trials.*

before going to No 43 Sqn. Its collision with the Hornet over Windmill Hill, near Chichester, marked its demise, and it was struck off charge.

HORNET HISTORY

Designed as a private-venture prototype interceptor to Specification F.20/27, the Hornet was initially powered by a 420 h.p. Rolls-Royce F.XIA in-line engine, and was first flown by Bulman in March 1929. It was then acquired by the Air Ministry under Contract No 887063/28, re-engined with a 480 h.p. Rolls-Royce F.XIS and given the serial number J9682.

Assigned to the Aeroplane & Armament Experimental Establishment (A&AEE) at Martlesham Heath from May 27, 1929, until July for trials, it was displayed at the Olympia Aero Show during May 16–27 that year, being said to have “come straight from Martlesham Heath after 50 hours test flying, and has only had a routine wash down”. It was then again re-engined, this time with a 525 h.p. Rolls-Royce F.XIIS. It returned to the A&AEE in February 1930, and in March it went to the Royal Aircraft Establishment (RAE) at Farnborough. It then went that same month to No 1 Sqn for Service trials, where it met its end.

The Hornet had been due to appear in the New Types Park in the RAF Pageant at Hendon on June 28, 1930, but it was announced in the technical press that it had been “put back on the Secret List and will not be able to be shown in the New Types Park”; a rather clumsy attempted

deception on the part of the manufacturer, especially as the collision had been reported previously. In August 1930 Hawker announced that it had received a contract for the production version of the Hornet, to be named Fury.

Despite the foregoing, Mason says that Bulman demonstrated the Hornet in the Balkans in 1931. This is hard to believe, for if it had lost its upper wing in an aerial collision at 3,000ft and plunged into the ground on April 11, 1930, it is unlikely that enough of it remained for it to be rebuilt. However, Mason contradicts himself in the individual type histories at the end of his book, where he ends the history of J9682 with its collision with the Siskin and makes no mention of the 1931 Balkan tour to which he refers elsewhere. Moreover, it has so far proved impossible to find any contemporary reference to Bulman’s Balkan tour in 1931.

Another person who became aware of the inconsistencies in the Hornet’s history was the late James D. Oughton. In April 1987 he cast doubt upon the Balkan tour, but offered a suggestion as to which aeroplane might have been used if it did take place. Oughton’s candidate was the private-venture Hawker Norn, the naval equivalent of the Hornet to Specification N.21/26 and the prototype of the Nimrod, the Fury’s counterpart for the Fleet Air Arm (FAA). Initially unnamed, the Norn made its maiden flight at Brooklands on February 20, 1930, and was already part way through its official trials when the Hornet was lost. It was



ABOVE Bulman's snapshot bears the handwritten inscription "Novi Sad 2 July 1931" on the reverse. The Tomtit is almost certainly G-AASI, and the nose of an inline-engined biplane with roundels is visible behind, on the right. Also on the back are the names of the individuals; from left to right, "Ludvig, Hayward, Osborn, Eales, Ferdo".

heavier than the Hornet and had increased fuel tankage and provision for radio.

Following official trials and deck and catapult trials from March 10, the Norn returned to Brooklands on July 25, and was fitted with radio and flown to RAE Farnborough by P.E.G. Sayer on September 15. Oughton suggests that it was after this that the Balkan tour, "if it ever existed", might have taken place, not in 1931 but between late July and early September 1930, using the Norn. The latter was subsequently used for extensive trials and was later allotted the serial S1594; it remained in service until 1933, ending its life as Ship's Catapult Dummy No 14 at the end of that year.

AN ALTERNATIVE SOLUTION

This proposition is thrown into doubt by two original photographs in my picture library that are part of a collection that once belonged to Bulman himself. The snapshots depict groups standing in front of a Tomtit, probably G-AASI after its Cirrus Hermes in-line engine had been replaced by a Wolseley A.R.9 radial and it was being used by the manufacturer. The photos are captioned in pencil on the back as being taken at Novi Sad on July 2, 1931.

Novi Sad, now in Croatia, was a constituent republic of Yugoslavia at that time. Just visible in the background of one of the photographs is a Rolls-Royce engined Hawker type, but not

enough of it is visible to enable it to be identified. So it seems that a Hawker team did indeed visit Yugoslavia around July 1931, but exactly which machine went there remains undetermined.

The Norn can probably be ruled out, as by this time it was involved in FAA trials. In his main text Mason says that the Yugoslavs placed their first order for the Fury, for six machines, before the first "true Fury" had flown. But in his individual histories he states that this batch for the Royal Yugoslav Air Force was ordered under Contract No 289711/32 and delivered in 1932, so none of these was available as early as July 1931.

However, the first production batch of Fury Mk Is for the RAF, K1926-K1946, was built between October 1930 and March 1931 and they were delivered to the RAF during April. It is on record that the last of these, K1946, was loaned to Hawker for trials and demonstration work, so this could well have been the machine that went to the Balkans, accompanied by the Tomtit. The company would not have wanted to reveal a foreign client until a contract had been secured, so it was in its interest to keep quiet about the Balkan tour. Thus it seems that the 1931 Balkan tour did take place, probably using Fury K1946, but was not publicised. Whatever the case, the loss of the Hornet did nothing to deter the RAF from ordering Furies, and both Nos 1 and 43 Sqns soon replaced their rather ungainly Siskins with the sleek new fighter.



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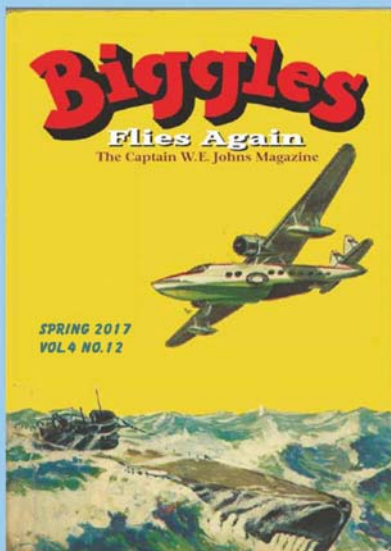
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BLUE ON BLUE

THE GLOSTER METEOR & THE 1955 REVOLUTION IN ARGENTINA

In 1955 Argentina was rocked by two attempts to overthrow President Juan D. Perón, whose regime had descended into a brutal dictatorship. Latin American aviation historian **SANTIAGO RIVAS** describes how the Meteors of the *Fuerza Aérea Argentina* played a very active part in both attempts — on both sides . . .



Argentina became the first export customer for the Gloster Meteor when it ordered 100 F.4s in May 1947, the first 50 to be examples from RAF stocks, the remainder to be provided new from the factory. The first arrived at Buenos Aires by ship that July. The last, I-100, delivered in July 1949, is seen here at Base Aérea Comandante Espora, south of Bahía Blanca, in the late 1950s.



AT THE END of the Second World War, Argentina, where German influence had traditionally been very strong, found itself in the beneficial position of having largely retained its neutrality throughout the conflict, although it had supplied Britain with regular shipments of valuable livestock, which avoided attack by German U-boats owing to the Argentinian ships' neutrality. After the war, Britain repaid part of its debt to Argentina by agreeing to the delivery of state-of-the-art weaponry, including 100 Gloster Meteor F.4s, 30 Avro Lincolns and 15 Lancasters from 1947, making the newly-minted *Fuerza Aérea Argentina* (FAéA — Argentinian Air Force) the most powerful air arm in Latin America.

By 1955 about 50 of the Meteors were still operational with the *VII Brigada Aérea* (7th Air Brigade), based at *Base Aérea Militar* (BAM — Military Air Base) Morón on the outskirts of Buenos Aires. By this time, the political situation in Argentina had become very tense, owing to a growing economic crisis exacerbated by the unpopular government of *General* Juan D. Perón, whose strongarm tactics to retain power were dividing the nation.

A FAILED COUP

On June 16, 1955, a military coup organised by anti-Perónist factions within the Argentinian armed forces, including the *Aviación Naval*

(AN — Naval Aviation) and parts of the FAéA, was launched in an attempt to overthrow the President. The coup would see the first air combat in the skies over Buenos Aires.

At 1240hr four Navy Beechcraft AT-11s and 15 North American AT-6A Texans bombed the Casa Rosada, the President's official residence in the capital, believing that Perón was in the building. Receiving information that aircraft were incoming from BAM Punta Indio, 100 miles (165km) south-east of Buenos Aires, to bomb the capital, the loyalist elements of the FAéA issued an order to scramble four Meteors from Morón. These included I-039, with *Primer Teniente* (1st Lt) Juan García at the controls; I-077 flown by Pr Tte Mario Olezza; I-090 (Pr Tte Osvaldo Rosito) and I-063 flown by *Teniente* (Lt) Ernesto Adradas. Their mission was to intercept anything flying over the city and, if necessary, shoot down any aircraft that showed hostile intentions.

A few minutes later two more Meteors, including I-032, flown by *Capitán* Jorge Mones Ruiz, took off from Morón. However, these were coup sympathisers, and were tasked with flying over the capital on a combat air patrol. Another section took off from Morón shortly afterwards, commanded by Pr Tte Juan Carlos Carpio, this cadre also supporting the coup.

After bombing the Casa Rosada, the Navy aircraft landed at Ezeiza Airport, south-west of Buenos Aires, from where rebel operations continued. After having flown over the smoking

OPPOSITE PAGE A *Fuerza Aérea Argentina* (FAéA) captain in full flying gear poses in the cockpit of his Meteor F.4. By 1955 President Juan Perón's increasingly repressive grip on power had begun to create divisions within the Argentinian military, leading ultimately to an attempted coup that June. PHOTOGRAPHS BY AUTHOR UNLESS OTHERWISE STATED



LEFT President Juan Domingo Perón enjoying his inauguration in Buenos Aires on June 4, 1946. Perón, a former soldier and military attaché to Chile, began his presidency on a wave of working-class optimism, vowing to make Argentina the leading economic force in South America and doing much to improve workers' rights — it was not to last.

BELOW More than 120 North American AT-6/SNJ's were operated by Argentina's Aviación Naval, the service acquiring its first mixed batch of refurbished AT-6As and SNJ-4s from American surplus stocks in 1947. Navy serial 0208/EAN-219 was originally an SNJ-4 and was struck off charge in 1970.

Casa Rosada, the four loyalist Meteors continued patrolling the capital. The weather was poor, with low-visibility conditions making the search for the rebel aircraft difficult. However, García spotted a pair of Navy Texans flying over the *Aeroparque 17 de Octubre*, the city's domestic airport (known after the removal of Perón as *Aeroparque Jorge Newbery*), about three miles (5km) from the Casa Rosada, and ordered his wingmen to follow him.

The Meteors formed an echelon and approached the Texans, which comprised AT-6B serial 0342, coded 3-A-29, commanded by *Teniente de Corbeta* (Sub-Lt) Máximo Rivero Kelly, and AT-6A serial 0352, coded 3-A-23, with *Guardiamarina* (Midshipman) Armando Román at the controls, both of which were on approach to the *Aeroparque* in order to land and refuel. Believing the Meteors were being flown by rebels (the majority of the pilots of VII Brigada Aérea had agreed to support the coup), the pilots of the Texans waggled their wings to

salute their comrades. The pilots of the Meteors did the same. As García drew closer, however, he opened fire on Rivero Kelly, but scored no hits. As the Meteors flashed past, Rivero Kelly put his Texan into a steep dive for the deck, pulling up just metres above a train bound for Tigre, a suburb of Buenos Aires. Near San Isidro, Rivero Kelly hauled his Texan up into a cloudbank and headed back to Ezeiza.

Meanwhile, Román's Texan was attacked by the other Meteors, although Olezza and Rosito directed their fire away from the Texan, being sympathetic to the coup-supporters' cause. Adradas, in Meteor I-063, was loyal to the government, so took aim at the AT-6A and fired. The 20mm rounds hit the starboard side of the Texan and the wing caught fire. Román baled out into the Río de la Plata below.

A few minutes later loyalist *Vicecomodoro* (Vice-Commodore) Carlos Sísiter, chief of the VII Brigada Aérea's *Escuadrón I*, took off from Morón in Meteor I-052 to attack the Navy





aircraft at Ezeiza airport. Alerted to the presence of anti-aircraft artillery, Síster performed his attack at low altitude and high speed. The Navy personnel believed that Síster was a supporter of the coup and made no efforts to defend the airfield until the fighter began firing on the aircraft on the ramp.

Having completed his first pass, Síster saw Rivero Kelly's Texan arriving at the airport and attacked, but without scoring any hits. Síster then undertook an attack on two transports — an AT-11 and a Consolidated Catalina — the latter returning machine-gun fire from the aircraft's gun position. On Síster's third pass the Meteor's cannon jammed, forcing a return to Morón. The ultimate result of the attack was damage to two airliners — one of Scandinavian Airlines System and the other belonging to *Aerolíneas Argentinas* — and one transport, Beechcraft AT-11 serial 0273, callsign 3-B-11.

STREET-LEVEL METEORS

Meanwhile, another group of rebel pilots took off from Morón. One of the primary missions of the rebel jet fighters was to attack local radio antennae and the Casa Rosada in support of Navy operations. The first to take off in this cadre was Tte Juan Boehler in I-019, with orders to destroy radio antennae, which he duly did.

At 1458hr an order was issued to prepare a joint attack with the AN on the Casa Rosada, this group taking off from 1551hr. The first wave of the attack was undertaken by AN Texans, AT-11s and Catalinas, the Meteors following low along Avenida Rivadavia, connecting BAM Morón to the Casa Rosada. Arriving at the Congress building a short distance west of the Casa Rosada, the Meteors descended to fly between the buildings of the Avenida de Mayo, arriving seconds later at the Plaza de Mayo,



TOP Following the failure of the attempted military coup in June 1955, four of the Meteors operated by the rebels escaped to neighbouring Uruguay, where I-094 is seen here being inspected by Fuerza Aérea Uruguaya (Uruguayan Air Force) personnel.

ABOVE The remains of an automobile after the rebel bombing of Plaza de Mayo in the centre of the capital during the June 1955 attempted coup. One pilot, Tte Guillermo Palacio, detached his Meteor's ventral fuel tank in flight, creating an effective napalm-type bomb.

where they opened fire on the Casa Rosada and the anti-aircraft artillery deployed there after the first attack. Teniente Guillermo Palacio used the ventral auxiliary fuel tank of his Meteor as a makeshift napalm bomb, destroying several cars parked near to the Casa Rosada. Similar attacks continued through the afternoon, the aircraft refuelling at Morón and returning to Plaza de Mayo. Radio antennae were attacked again, as were troops of the *Regimiento 3 de Infantería Motorizado* marching towards Ezeiza.

By the late afternoon of June 16, after heavy fighting in the capital, it had become clear that without the support of the Army and the bulk



THIS PAGE When the rebel FAéA Meteors landed at Montevideo in Uruguay in the wake of the failed June 1955 military coup, the Uruguayans had little first-hand experience of jet-powered fighter aircraft, its own most advanced fighter being the North American F-51 Mustang. Naturally, the Uruguayan Air Force made the most of the opportunity to explore the most modern military aircraft then in South America. The four Meteors that escaped to Uruguay — I-031, I-058, I-094 and I-098 — were all comprehensively inspected by the Uruguayans, as seen here, before being returned to Argentina the following month. The Uruguayans received their first jet aircraft in the shape of the Lockheed T-33 trainer in the late 1950s.





ABOVE A 1949 photograph of a group of FAéA pilots in front of an impressive line-up of the air arm's Meteors at Comandante Espora. The latter was one of the most active air bases during the Revolución Libertadora in September 1955, although none of the Meteors — rebel or loyalist — ever operated from it during the revolution.

of the FAéA, the attempted coup had run out of steam. The rebel Meteor pilots had no option but to escape with their mounts to neighbouring Uruguay, along with a number of other aircraft including a Fiat G.55, two Navy Douglas C-54s, seven Navy C-47s, three Catalinas, four AT-11s and 11 Texans. During their escape flights Meteors I-058, I-064 and I-098, flown by Lts Marelli and Jeannot and Capt Carús respectively, were used to attack the Police Central Department and the Casa Rosada again.

Six Meteors escaped to Uruguay, but Jeannot in I-064 had to ditch in the Río de la Plata near the coast when he ran out of fuel, and Meteor I-029 made a forced landing in a rural area with the undercarriage retracted. The four remaining escaped aircraft were returned to Argentina in the hands of loyalist pilots the following month.

THE REVOLUCIÓN LIBERTADORA

Three months later, on September 16, a second coup was staged, much bigger and with far more popular support. The Meteors were to fight on both sides again. Although personnel at BAM Morón remained loyal to the government, the *Fábrica Militar de Aviones* (FMA — Military Aircraft Factory) at Córdoba in north-central

Argentina was in possession of three Meteors for repairs — serials I-043, I-061 and I-079 — which would be used by the rebels, at that time in control of the FMA and the *Escuela de Aviación Militar* (EAM — Military Aviation School).

These three Meteors would see action during the morning of September 16, with a show of strength over troops of the Army Artillery School, which was also in the hands of the rebels. Under attack by loyalist soldiers from the nearby Infantry School, the Army Artillery School troops had little armament, so the Meteors, along with some Percival Prentices, AT-11s and IAé DL-22 trainers of the EAM, flew low over the Infantry School soldiers to intimidate them. Although the three Meteors initially had no armament or gunsights, the rebel technicians worked hard to fit two of the type's four 20mm cannon and gunsights on each. The FMA test pilots involved in this action were Pr Ttes Rogelio Balado and Alberto Herrero, led by Capt Suárez, who were joined shortly thereafter by Pr Ttes Hellmuth Weber, Luis Morandini and Rossi.

The next action would involve Meteors on the loyalist side, when it was decided to attack the old destroyers *ARA Cervantes* (T-1) and *ARA La Rioja* (T-4) of the rebel *Fuerza Naval de*

Meteor I-066 taxiing at an airfield some time after the September 1955 revolution, but still bearing the somewhat crude markings applied by hand to the aircraft by the rebels. The "I" designation was originally applied to denote "Interceptor", but when the type was modified in the late 1950s to carry rockets and bombs for the ground-attack role, the designation was changed to "C" for Caza (Fighter). Thus I-066 became C-066.



RIGHT *The ARA La Rioja in March 1955. An elderly Mendoza-class destroyer built for the Argentinian Navy by J. Samuel White in Cowes on the Isle of Wight in 1929, the rebel-controlled La Rioja was heavily damaged during maritime strikes by loyalist Meteors during the revolution, on September 16, 1955.*

Instrucción (Instruction Naval Force), which were blockading the Río de la Plata. In the early morning *Capitán de Fragata* (Commander) Hugo Crexell received a direct order from President Perón to co-operate with the FAéA on an attack on the rebel ships. Accordingly he visited VII Brigada Aérea and was taken on a reconnaissance flight over the river.

At 0900hr four Meteors commanded by Vicecomodoro Síster took off from Morón to attack the rebel destroyers, aboard which personnel had prepared the ships' three 40mm Bofors double-barrelled anti-aircraft cannon to greet the twin-engined fighters. At 0930hr the Meteors climbed and dived over the *La Rioja*, firing with their cannon. The ship returned fire, but with little effect. The ship was damaged by the four jets, two of which were fired on by the artillery of the *Cervantes*, which was approaching to defend the *La Rioja*. Shortly afterwards, three more Meteors, commanded by Vicecomodoro Pérez Laborda, took off to attack the two destroyers, all scoring hits and all returning to base safely.

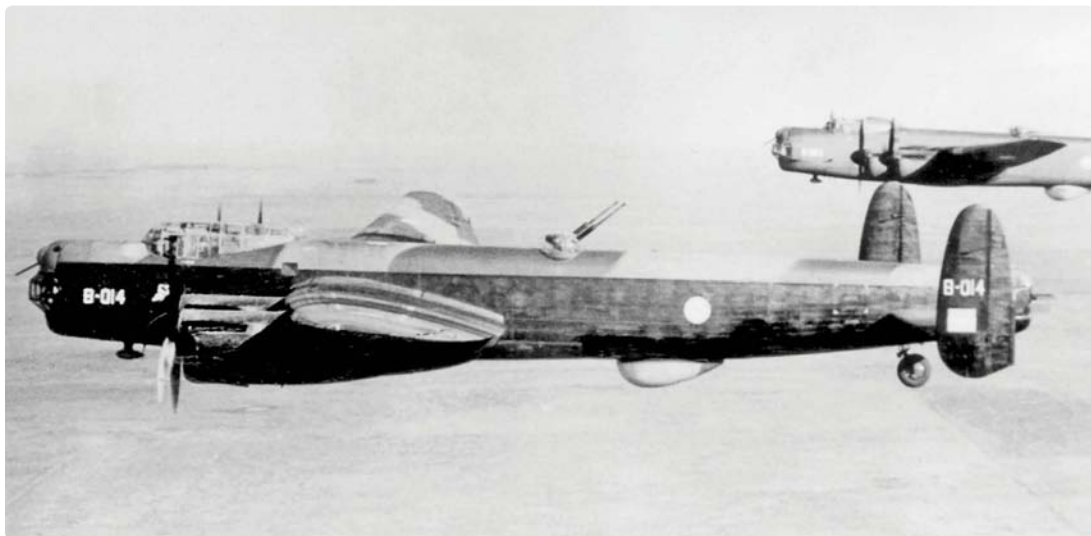
The next loyalist attack was undertaken against two Infantry Landing Ships (Nos 6 and 11) which were crossing the river from Martín García Island, home to the rebel-held *Escuela de Marinería* (Maritime College), to reinforce the rebel Naval School base at Río Santiago near the city of La Plata. Four Meteors, along with five IAé-24 Calquin twin-piston-engined ground-attack aircraft, were despatched to attack the ships. Medium Landing Ship No 1 was sent out from Río Santiago to support the vessels, but



also lacking anti-aircraft artillery, it too received fire from the loyalist aircraft. The attack was repeated minutes later, resulting in two rebel dead and several injured.

Back at Morón, Crexell began to plan the next series of attacks, explaining to the pilots that the best method was to attack the ships at low altitude and from an angle diagonal to the stern. The *Cervantes* and *La Rioja* were attacked for a third time at 1100hr, resulting in heavy casualties, including several killed. One of the guns of the *La Rioja* was hit, although the crew managed to keep firing after completing a repair. The rebel destroyers were attacked yet again near the mouth of the river, close to the southern Uruguayan coast, but this time suffered little damage, the strikes ceasing shortly afterwards.

Loyalist attention now turned to Río Santiago,



which was subjected to attacks by Avro Lincolns, Calquins and Meteors. The only artillery at the base comprised the three double-cannon aboard patrol ships *ARA Murature* and *ARA King*. The attacks continued until nightfall. Meanwhile, back at Córdoba, the rebel Meteor pilots flew strike missions against the loyalists throughout the day.

METEOR VS LINCOLN

The following day, September 17, loyalist Meteors entered the action in Córdoba. Three aircraft were prepared at Las Higueras airport in Río Cuarto, south of Córdoba, to attack the airport at Pajas Blancas, north of the city, where the Meteors were to attack four rebel-operated Avro Lincolns. Before the loyalist Meteors took off, one of the rebel Lincolns bombed Las Higueras, destroying a Lancaster. One Meteor, reportedly flown by a pilot sympathetic to the rebel cause, was scrambled but did not intercept the bomber.

Preparations for the Meteor attack on Pajas Blancas were stepped up. The three fighters took off shortly after 1700hr and headed north at 435 m.p.h. (700km/h), approaching at low altitude between the mountains in order to reach a point to the north of the airport from which to

ABOVE The FAéA acquired 30 Avro Lincoln B.2s, again a mixture of ex-RAF and new-build aircraft (12 and 18 respectively) in 1947, to supplement its bomber force of Lancasters. The type entered service that year and operated with 1 Grupo de Bombardeo de V Brigada Aérea until the last example was retired in 1967.

commence a north-south line-astern attack. On the ramp were three Lincolns, one of which, with a full load of bombs, was being refuelled. With a planned separation of 1,000m (3,300ft), the Meteors, led by *Mayor* Catalá, strafed the ramp, damaging the bombers, one seriously. Only one would fly again during the revolution. Having completed their mission, the Meteors then returned to Río Cuarto, but not before flying over rebel-held Córdoba. Mayor Aubone arrived back at Las Higueras with several bullet holes in his Meteor, the result of Capt Domínguez flying too close behind him during the attack.

Another strike was prepared immediately, but a column of rebel troops was spotted heading towards Río Cuarto, and Las Higueras was evacuated. The Meteor pilots escaped in an AT-11 that was intercepted by a rebel Calquin, but managed to escape with little damage. The Meteors remained at Las Higueras, but took no further part in the action.

On the night of September 17, rebel Meteors

The FAéA's Meteors retained a natural-metal finish during the revolution, the rebels applying hand-painted symbols including the letter "V" with a cross above it, denoting "Cristo vence" — "Christ wins" — symbolising their support for the Catholic church, which opposed Perón. Loyalist Meteors had a "V" with a "P" for "Perón". Artwork by TIM BROWN © 2017





LEFT Rebel groundcrew members pose with a Meteor at Córdoba during the Revolución. The "MR" lettering applied to the forward fuselage stands for Movimiento Revolucionario — "Revolutionary Movement".

BELOW Following the conclusion of the Revolución on September 21, 1955, a victory parade was organised for the following day, to include a flypast by FAéA aircraft, including the IAé-33 Pulqui II and Meteors seen here being prepared at the FMA.

from the FMA in Córdoba, flown by Rogelio Balado and Hellmuth Weber, attacked loyalist anti-aircraft artillery units approaching Córdoba from the east. Although the Meteors were damaged, they remained in service.

Combat continued on the 18th with a bombing mission undertaken by two loyalist Lincolns from Morón against the EAM in Córdoba. Weber took off from the FMA airfield in one of the rebel Meteors when the bombers attacked the runway at the nearby FMA, intercepting the Lincolns and firing on one of them, but without hitting it. The bombers separated and Weber positioned himself behind one of them to attack it from below, but his cannon jammed and he was forced to return to the FMA airfield.

Another Meteor, flown by Balado, took off from the FMA to intercept the other bomber, which was continuing its raid. The bombs from the Lincoln fell close to the runway while Balado was taking off, but he managed to get airborne. After attempting, to no avail, to convince the bomber crew to join the revolution, Balado made a series of very close passes and threatened to

fire, eventually convincing the bomber crew to return to Morón.

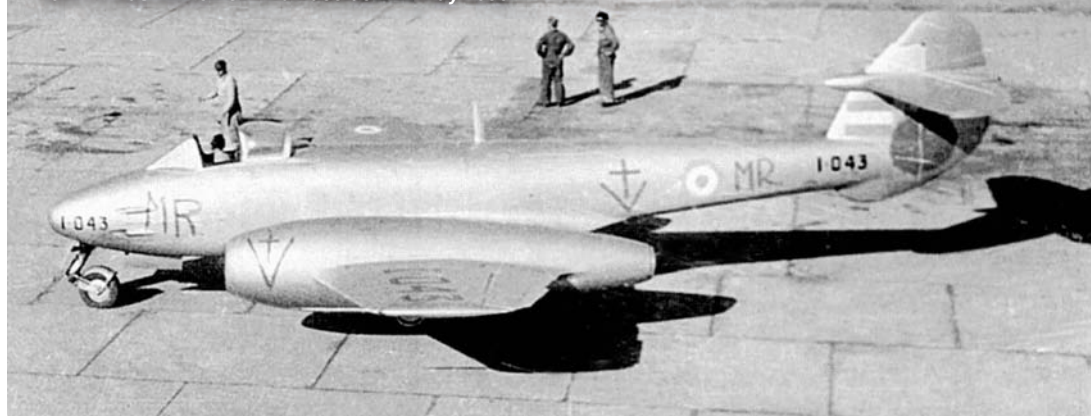
On September 19 loyalist troops launched an attack on Córdoba from the north-east, occupying the northern train station. The rebels launched a counter-attack using napalm-equipped Calquins and Meteors, the latter being modified to carry two Calquin napalm tanks on underwing racks. The opposing artillery was intense, but the Meteor pilots managed to hit their targets, dropping not only the napalm but their ventral fuel tanks too, as Guillermo Palacio had done during the failed coup of June 16. The Meteors suffered with frequent cannon problems, however, owing to poor maintenance; one of the Meteors was fitted with two 20mm cannon from the dorsal turret of a Lincoln. The Meteor attacks did not stop the loyalist advance on Córdoba, but they did weaken the opposition and provide more time.

By the end of September 19 President Perón had realised that Argentina was on the brink of a destructive civil war, and he established a military government to negotiate with the rebels

"THE OPPOSING ARTILLERY WAS INTENSE, BUT THE METEOR PILOTS MANAGED TO HIT THEIR TARGETS, DROPPING NOT ONLY THE NAPALM BUT THEIR VENTRAL FUEL TANKS TOO . . ."



Rebel-operated Meteor I-043 at the FMA in Córdoba during the September revolution. This aircraft was originally built as part of an RAF batch and given the serial EE540, although it never served as such and was diverted to become part of the FAéA consignment in June 1947. It was written off in an accident in May 1956.



for a ceasefire. As a result, the fighting stopped, giving both sides time to reorganise their troops.

Detecting a significant movement of Perónist troops south-west of Córdoba, the rebels launched a pre-emptive attack, deeming the movement a violation of the ceasefire. By this time supplies of jet fuel (Avtur) at the FMA had been exhausted, so normal fuel (Avgas) was used instead. The Gloster manuals stated that the latter could be used for short periods but that combat should be avoided in this situation.

Two Meteors were prepared at the FMA on the 19th for a mission making firing passes over the loyalist troops to stop their advance. The first Meteor, flown by Hellmuth Weber, took off shortly after 1200hr. The second Meteor, I-079, flown by Tte Luis Alberto Morandini, took off when Weber returned after having made several passes over the loyalists. When Morandini was returning to the FMA to land, one of the Meteor's engines stopped, probably owing to the use of the unsuitable fuel, and the aircraft stalled and crashed. Morandini was the only Meteor pilot to die during the revolution.

A NEW REGIME

On September 21 the fight ceased definitively and the rebels declared victory after Perón resigned and fled to Paraguay. The following day a victory parade was held in Córdoba, in which the Meteors that had taken part in the *Revolución Libertadora* (Liberation Revolution), as it was known, flew with others from Buenos Aires in the hands of rebel pilots that had been unable to join in the coup.

Calquins, Lincolns, DL-22s, Prentices and one of the six Kurt Tank-designed IAé-33 Pulqui II prototype jet fighters also participated. The final participation of the Meteors was when two examples escorted the Aerolíneas Argentinas

DC-3 of Gen Eduardo Lonardi, leader of the revolution, to Buenos Aires, where Lonardi was to take the reins of the government.

These two significant milestones in Argentina's history — one a failed coup attempt and the other a nation-changing revolution — had seen the first combat operations of the FAéA's Meteors, which, during the June 16 coup attempt, earned the dubious distinction of having undertaken the largest aerial attack on the country's mainland. The rebel Meteors had operated in difficult conditions during the *Revolución Libertadora* but played a major part in overthrowing the Perón regime.



GLOSTER METEOR F.4 DATA

Powerplant 2 x 3,500lb-thrust Rolls-Royce Derwent turbojet engines

Dimensions

Span	37ft 2in	(11.3m)
Length	41ft 0in	(12.49m)
Height	13ft 0in	(3.9m)
Wing area	350ft ²	(32.5m ²)

Weights

Empty	11,217lb	(5,088kg)
Loaded	14,545lb	(6,597kg)

Performance

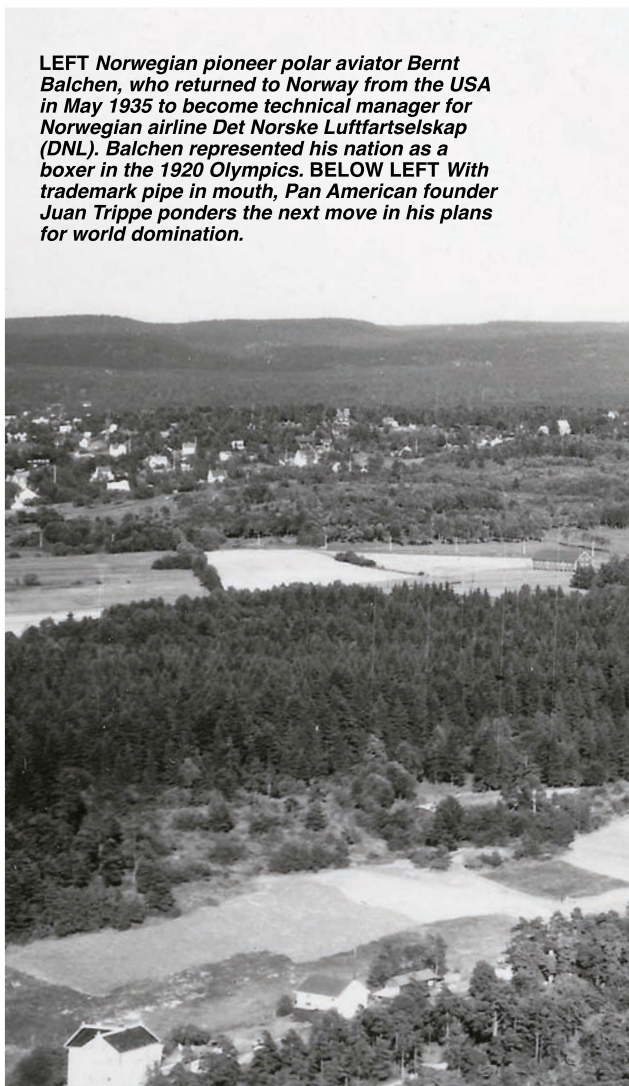
Maximum speed (clean config) at 10,000ft (3,050m)	580 m.p.h.	(933km/h)
Climb to 30,000ft (9,150m)	6min	
Service ceiling	44,500ft	(13,563m)

Armament

4 x fixed forward-firing British Hispano 20mm cannon mounted in front fuselage sides with 780 rounds of ammunition



LEFT Norwegian pioneer polar aviator Bernt Balchen, who returned to Norway from the USA in May 1935 to become technical manager for Norwegian airline Det Norske Luftfartsselskap (DNL). Balchen represented his nation as a boxer in the 1920 Olympics. **BELOW LEFT** With trademark pipe in mouth, Pan American founder Juan Trippe ponders the next move in his plans for world domination.



POLE POSITION

Norway's 1930s North Atlantic dream, Pan American & the Sikorsky S-43

With the advent of aircraft capable of carrying a meaningful load of passengers across vast distances, Norway's location to the north of Europe made it an ideal potential base for air services across the North Atlantic. **ROB MULDER** chronicles the nation's ill-fated attempt to establish an innovative pre-war transatlantic air route in co-operation with Pan American

Sikorsky S-43 amphibian LN-DAG, named Valkyrien, flies over Bærum, south of Oslo, during the aircraft's short tenure with DNL during 1936–38. The "Baby Clipper", as the type was known, first flew in 1935 and in April 1936 set a world altitude record for amphibious aircraft when pilot Boris Sergievsky and designer Igor Sikorsky reached 27,950ft (8,520m) during a flight from Stamford, Connecticut.



IN MAY 1935 the famous Norwegian pilot Bernt Balchen returned home from the USA to accept a job offer from Rudolf Olsen and Capt Hjalmar Riiser-Larsen, respectively the owner and managing director of Norwegian airline *Det Norske Luftfartselskap* (DNL). While in America, Balchen had become a representative of a number of American interests, some of which he handed agency of to *Østlandske Lloyd*, originally a shipping company which the Olsen family had acquired from Rolf Thorsteinson Andvord. In 1935 *Østlandske Lloyd* also began trading in aircraft, spare parts, instruments and other aeronautical equipment. Balchen was an official agent for the Northrop Model 3, the responsibility for which he also passed on to *Østlandske Lloyd*, which would later represent the products of the United Aircraft Corporation, an amalgamation of American aviation companies including Boeing, Pratt & Whitney, the Hamilton

Aero Manufacturing Co, Sikorsky and Stearman among others. *Østlandske Lloyd's* agency was also extended to include Sweden. Balchen's connections in the USA were not only restricted to aircraft manufacturers. Through his previous job with the Atlantic Aircraft Corporation (Fokker), he had established a network of contacts among the American airline companies, which would prove invaluable for future negotiations.

Homeland connection

During the 19th and early 20th centuries Norwegians had travelled *en masse* to the promised land and settled in the USA, mostly in the northern areas. Maintaining a connection with the homeland was important, however, and the new-found possibilities of modern air travel looked set to play a big role in the future.

The first Norse-American to return by air to Norwegian territory was Carl Benjamin "Ben"

Eielson, who, in April 1928, accompanied Australian explorer George Hubert Wilkins on an epic 2,200-mile (3,540km) flight in a Lockheed Vega from Point Barrow on the northern coast of Alaska across the Arctic Ocean to Spitsbergen, Svalbard, Norway.

The first Norwegian to cross the North Atlantic by air was Thor Solberg, who flew in a Loening Air Yacht amphibian from New York to Bergen via Newfoundland, Greenland, Iceland and the Shetland Islands in 1935. On his arrival in Norway, his flight was hailed as a huge success. Solberg had followed the so-called "Leif Erikson Route" used back in the Viking Age, when Nordic seafarers had sailed from Norway and Denmark to Iceland, Greenland and Newfoundland.

Iceland's location midway between Europe and North America made it of great strategic value, particularly to fledgling airlines on both sides of the Atlantic. Establishing a good position in Iceland would allow an airline to use it as a vital intermediate stop. In 1928 a small airline, *Flugfélag Íslands hl/f*, was established with Icelandic capital and technical assistance from German airline Luft Hansa (renamed Lufthansa from 1934), which operated mail services for some years during the summer months with Junkers-F 13s and W 33s. In return, Germany hoped to obtain traffic rights from the Icelandic government for a lucrative North Atlantic route.

In July 1929 Luft Hansa began to catapult mailplanes from passenger ships off the coast of the USA in order to speed the delivery of mail. The Germans were allowed 16 of these mail flights per year and operated the service until the onset of World War Two. They were also given a concession for four round trips on a southern transatlantic route from Lisbon, Portugal, to the Azores, Bermuda and New York, using Dornier Do 18 flying-boats and Blohm & Voss Ha 139 floatplanes.

The race for the North Atlantic

The Americans had not been idle either. The extensive negotiations between the Americans, British and French about traffic rights are well-known. The Europeans appeared to fall behind, however, when Pan American Airways Inc (PAA), run by the redoubtable Juan Trippe, introduced giant Martin and Sikorsky flying-boats to its fleet. These were operated on the Pacific and Caribbean services and played a major part in establishing PAA. Trippe was aware of the delays being experienced by the Europeans and began searching for alternatives.

In March 1932 Icelandic-American Gudmundur Grimson, working on behalf of the American airline Transamerican Airlines Corp, negotiated a franchise from Iceland for the establishment of airports to serve transatlantic air services.



DNL/SAS HISTORICAL SOCIETY VIA AUTHOR

ABOVE Captain Hjalmar Riiser-Larsen, who became DNL's managing director in 1933, was, like Bernt Balchen, one of Norway's most distinguished aviators, having accompanied Roald Amundsen on the latter's Arctic exploration flights during 1925–26 and participated in the *Norvegia* series of expeditions to the Antarctic in the late 1920s and early 1930s.

He also brokered a contract with Denmark for preferential treatment in opening routes to and from Greenland (then, as now, Danish territory). Transamerican promised the Danes a piece of the action if a route, terminating in Copenhagen, could be opened. Captain Andreas Peter Botved, who had made a pioneering flight from Copenhagen to Tokyo in April 1926, was made point of contact for the Americans in Denmark, and *Det Danske Luftfartselskab* (DDL — Danish Air Lines) was selected as the preferred airline.

On April 15, 1932, PAA purchased the right to develop the Transamerican route for \$5,000, with the latter retaining ownership. That July, however, the complete concession (which would expire at the end of 1936) was bought by Trippe for \$55,000. Back in 1928 PAA had established a research programme to investigate optimum routes across the North Atlantic. Before the purchase of the concession, PAA had explored the possibility of opening a service via Halifax, Nova Scotia, but this stalled because the government of Newfoundland was unable to supply the necessary specialist weather information. More research was undertaken and in July 1933 Charles and Anne Morrow Lindbergh set off on a reconnaissance flight for PAA along the North Atlantic route to northern Europe, the Baltic and western Europe, before returning to the USA via the South Atlantic.



On August 1, 1933, Hjalmar Riiser-Larsen took up his post as managing director of DNL. Board member Consul Johan L. Müller urged Riiser-Larsen to travel to Copenhagen and meet Lindbergh to discuss a route across the Atlantic. Riiser-Larsen made the trip, but did not get to meet Lindbergh and returned to Norway empty-handed. The general opinion in Norway was that the southern harbour town of Stavanger would be ideal as a transit point for an Atlantic route. Balchen preferred the old Hanseatic League city of Bergen, which had a train connection to Oslo and good shipping connections to the north and south of Norway. The Lindberghs visited Oslo, continuing on to Stavanger, but only flew over the city of Bergen.

In May 1935 Balchen took up his post as technical manager at DNL, which the previous month had received a ten-year concession from the Norwegian government for responsibility for all national and international air traffic, thus making the company an official state representative. During a visit to the USA, Balchen had talks with his friend André Priester at PAA to discuss future co-operation. One of the first things Balchen investigated was a more economical aircraft than the floatplane version of the Junkers Ju 52/3m, an example of which DNL had leased from Lufthansa for its scheduled Oslo—Arendal—Kristiansand—Stavanger—Haugesund—Bergen service, which opened on June 11, 1935.

The Sikorsky S-43 amphibian, which Balchen flew with Priester in the USA, seemed to be an ideal candidate. Initially DNL wanted to fly services using more economical landplanes,

but a lack of land airports along the route made this impossible; an amphibian would solve the problem. In addition, the S-43 had two instead of three engines (more economical to run), and was lighter and faster than the German floatplane.

The “Leif Erikson Route”

On June 27, 1935, Balchen wrote to Trippe, explaining that the Norwegians were interested in co-operating with PAA on a transatlantic route. He must have received a favourable response, as in January 1936 Balchen travelled to the USA to meet Trippe and discuss the details. Things began to move fast. Rudolf Olsen, owner of DNL, had already agreed with Carl Florman, managing director of Swedish airline AB Aerotransport (ABA), to establish a connecting service between the Norwegian coast (DNL preferred Bergen, but was also open to Stavanger), Oslo and Stockholm, the Swedish capital, should a trial North Atlantic service be opened in 1936.

The Scandinavians were all too aware that other European countries were also in America discussing similar routes — and that, if the other nations were successful, DNL and ABA could forget any co-operation with PAA. The Norwegian airline favoured an Iceland—Shetlands—Faroes—Norway (Stavanger) route by seaplane or flying-boat, as such a route was never more than 300 miles (460km) from land. Norway also had a weather station at Torgilbu on Greenland’s east coast, which could be used as an intermediate stop. The weather in this area during June, July and August was stable, with almost 24hr of “midnight sun” daylight.



DNL operations began in June 1935 with chartered Junkers Ju 52/3m floatplane LN-DAE, named Havørn. It was originally suggested that this aircraft, fitted with additional fuel tanks, could be used to fly the North Atlantic trial service from Bergen to Reykjavik. In the event, DNL purchased a single Sikorsky S-43 instead. Havørn was lost when it flew into a mountain near Hyllestad in June the following year.

ODD ARNESTAD COLLECTION VIA AUTHOR



MAP BY MAGGIE NELSON

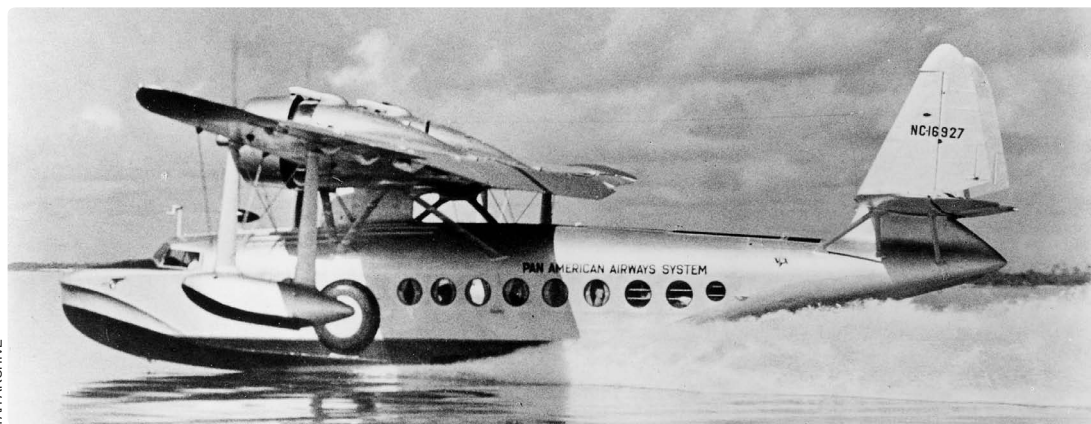
Balchen was given authorisation by Olsen to establish the “Leif Erikson Route”; Reykjavik—Tórshavn (capital of the Faroe Islands)—Bergen—Oslo—Stockholm, in co-operation with PAA if the Americans were willing to fly from New York to Reykjavik. He was also authorised by DNL to discuss conditions for the purchase of a Sikorsky S-43 for that route.

On January 15, 1936, Balchen had his first talks with PAA, indicating that DNL was keen to become PAA’s exclusive partner on the route. The latter airline had already placed a substantial order for S-43s, construction of which was well under way. The Norwegian airline expected to be allocated an S-43 from the PAA order (one of which, twin-finned S-43B NC16927, is seen “on the step”, **BELOW**). Before the next meeting, Balchen travelled to the Sikorsky factory at Bridgeport, Connecticut, where he boarded an S-43 for a flight to San Francisco and back to evaluate the amphibian. He was duly impressed.

On January 23 Balchen had further discussions with PAA and expected to conclude a firm deal within a week. Important for the Americans was that a connection east of Bergen or Stavanger was established, preferably all the way to Leningrad (now St Petersburg) in Russia.

Meanwhile, in Norway Riiser-Larsen opened informal talks with the Norwegian Ministers of Trade and Defence with a view to securing financial support. The departments explained that support would be forthcoming when a connection from Reykjavik to New York was made. Furthermore, guarantees from PAA that the proposed trial service in 1936 would be made permanent in 1937 were required. If such guarantees were made, the Norwegians could give PAA a 15-year concession.

Back in the USA Balchen was given support by Norway’s highest-ranking diplomat in the USA, Wilhelm Thorleif von Munthe af Morgenstjerne. The American government told Morgenstjerne





(seen at left, **ABOVE**) that it was not interested in the northern New York—Reykjavik route, so the Norwegian diplomat clearly had much work to do if the North Atlantic plan was to stand a chance of success. In Norway, DNL was not yet convinced that an expensive order for the S-43 should be placed. A Ju 52/3m floatplane with extra fuel tanks or a chartered S-43 would probably do the job for the trial service in 1936, after which a better aircraft could be acquired for the 1937 season, when the route became permanent.

While in Washington DC in early 1936 Balchen met, quite by chance, his friend Jim Farley, the US Postmaster General and a powerful political ally, and the pair had lunch together at the Mayflower Hotel. During the lunch they decided

ABOVE The prototype of the attractive S-43, NC15061, during an early test flight. Three main variants were produced; the single-fin Pratt & Whitney Hornet-engined S-43A and a similarly-powered twin-finned version, the S-43B, which was usually delivered as a flying-boat and operated from water only. The final variant, the S-43W, was powered by Wright Cyclones.

to request a meeting with President Franklin D. Roosevelt, who knew Balchen from his polar exploits of the 1920s. Indeed, Balchen had a very good name in the USA; Anthony Drexel Biddle Jr at the American Legation in Oslo, wrote: "Your [the President's] cordial reception of Bernt, whose standing in Norway is just about 100 per cent, contributed importantly towards focusing Norwegian interest in American aviation products, as well as the system we employ both as to flying and ground administration".

The tide turns

The meeting between Roosevelt, Balchen and Farley took place at 1230hr on February 19, 1936, and lasted around half an hour. Roosevelt did not allow notes to be taken, so exactly what was said is unknown. However, Balchen wrote in his memoirs that Roosevelt was presented with the plans for the proposed transatlantic arrangement and showed a great deal of interest. The President suggested that the Norwegians should meet with the US International Civil Aviation Committee to explain their plans.

On February 21 Morgenstjerne and Balchen travelled to Congress to meet the committee, which was led by Assistant Secretary of State Robert Walton Moore. The pair managed to persuade the committee to support the idea and were reassured that PAA had not yet signed any agreement for a North Atlantic service. Four days



ABOVE The prototype S-43 under construction at the Sikorsky factory at Bridgeport, Connecticut. The single biggest operator of the type was PAA and its Pacific and Latin American affiliates, which found the type eminently suitable for their needs.

LEFT Pan American founder Juan Trippe in characteristic pose. By mid-1936 progress on the joint DNL/PAA North Atlantic trial flights had begun to slow down, and Trippe had begun exploring Foynes in Ireland as an Atlantic terminus instead.

BELOW Valkyrien bound for New York aboard a steamer in August 1936. On the far right is Bernt Balchen and second from the left is Chris Braathen, who did much of the liaison work between DNL and Sikorsky. Sadly he was killed in a crash in 1937.





ABOVE The DNL S-43A on home soil at Gressholmen, the seaplane port at Oslo. Seating in the S-43 was usually arranged for three crew and 16 passengers, but a coach-style configuration could accommodate up to 25. Military variants were operated by the US Army Air Corps as the OA-8 and by the US Navy and Marine Corps as the JRS-1.

later, after many telegrams back and forth, DNL's board of directors agreed to order one S-43 with the proviso that the aircraft could be sold on if no trial North Atlantic flights were undertaken. During the final talks Balchen requested that PAA be responsible for all stocks of spares for the S-43, to which the American airline agreed. As soon as the Sikorsky order was placed, ABA confirmed Swedish participation from the west of Norway eastward, in 1936 through to the Finnish capital at Helsinki, but from 1937 all the way to Leningrad.

A Memorandum of Agreement was signed by DNL and PAA with a validity of 25 years. The most important point was that the airlines agreed to start a series of trial flights in 1936, on completion of which a regular service between Norway and Iceland would be opened. A maximum of one flight per week for each airline was agreed upon.

Concurrent with the talks with the Norwegians, PAA was also discussing landing rights for Greenland with Denmark, with the result that the Americans agreed to allow DDL crews to participate on ten trial flights between New York, Reykjavik and Copenhagen. This news fell like a bomb in Norway, but the whole matter seemed to be based on old suggestions by the Americans. The Norwegian deal was still valid, according to PAA. The DNL board of directors received the contract and signed it during a meeting on March 31, 1936, Trippe signing a copy of the agreement in New York on the same day.

With the contract signed, S-43 c/n 4312 had to be ready by June 9 for shipment to Norway in order for the North Atlantic trial service to remain on schedule. However, the delivery of S-43s to PAA was being delayed owing to the

latter's additional demands for improvements and modifications, of which there were no fewer than 874. This inevitably delayed the delivery of the DNL S-43. The Norwegians tried to arrange a swap with one of the completed PAA examples to secure an on-time delivery, but the American airline was not interested in such a deal.

Delivery of the DNL S-43 was rescheduled for July and Balchen travelled by steamer to New York to make its first flight. He arrived too late, however, as the aircraft's maiden flight was made on July 10 from the Housatonic River in Connecticut. It was not until July 29 that Balchen could officially receive the aircraft, which now carried the Norwegian civil registration LN-DAG and the name *Valkyrien*. It was subsequently dismantled and transported by ship from New York to Oslo by Norwegian steamer, arriving in Norway on August 9. Over the next few days the aircraft was reassembled and on August 21, *Valkyrien* made its first flight from Norwegian waters; DNL had its amphibian and was ready to start trial flights between Bergen and Reykjavik.

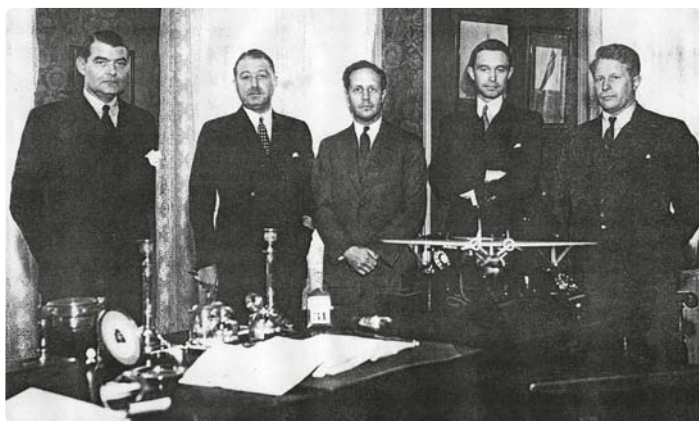
Trying times

In the meantime, DNL had applied to the Norwegian government on behalf of PAA for a Norwegian concession for 15 years and had hoped to have everything ready by May 1, 1936. Problems with the terms and conditions dragged out the approval, but by May 20 most of the relevant departments had approved the deal. Only the Customs Department had not replied, and would not do so until October. The Norwegian government sent a preliminary reply to PAA to the effect that it agreed to most of the points



LEFT Following the cancellation of the transatlantic trial flights in the summer of 1936, Valkyrien was used for a month on DNL's Oslo—Stockholm service, and is seen here moored at the jetty at Gressholmen. Despite the advantages of operating a type that could take off from Bromma's concrete runway and land on water at Oslo, DNL's directors showed little enthusiasm for it.

BELOW A poor-quality image of DNL and PAA representatives during a meeting in Oslo in February 1937, including Hjalmar Riiser-Larsen (far left), Rudolf Olsen (second left) and Bernt Balchen (furthest right).

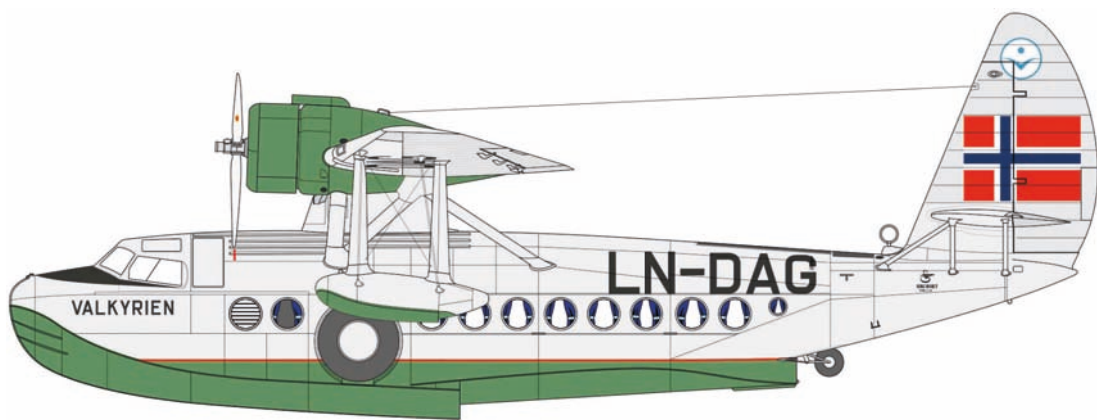


LEFT A rare DNL timetable for the summer of 1937, prominently featuring the airline's most recent acquisition on the outer flap. The S-43 was little used, however, and, by the time this timetable was issued, considerable efforts were being made to find a new owner for it. BJORN LARSSON COLLECTION

BELOW Valkyrien on its first flight over Oslo in 1936. Despite DNL's misgivings about the type, based more on the financial burden it represented than its capabilities as an airliner, it proved popular with other operators in Hawaii, Alaska, Brazil, Chile, France, Russia and China.

DNL/SAS HISTORICAL SOCIETY VIA AUTHOR





ABOVE The colour scheme used for Valkyrien was simple but attractive, the upper fuselage retaining a natural-metal finish while the lower fuselage, hull, undersurfaces of the floats and engine nacelles were painted in a medium green. The fin sported the Norwegian flag below DNL's logo. Artwork by KIM BRANTENBERG © 2017

except one. It suggested that the arrangement have a validity of ten years, with an option to cancel the contract if co-operation between DNL and PAA ceased. The Norwegian airline was not permitted to continue from Reykjavik to New York, as it had no relevant Danish concession.

At that point five trial flights between Norway and Iceland were scheduled for 1936, but it looked like PAA could not get its own Danish concession ready in time to operate the Reykjavik—New York sector. Another issue was the lack of weather information from Canada, which could not get the necessary infrastructure organised in time. Balchen and John C. Cooper, PAA's Vice-President, had settled on a preliminary agreement about the trial flights, and for PAA it was important for the trials to have started before the Icelandic (Danish) concession expired on December 31, 1936. The American airline was eager to start the trials, but found itself hampered by these issues with the Danish and Canadians.

When Balchen had been in the USA in July to pick up the S-43, he had also signed an additional agreement with PAA in which DNL would sell

the amphibian at cost price to the American airline. The Norwegian company had never been comfortable with the purchase of the S-43, which it felt did not really fit into its network plans, and offered a deal in which the aircraft would be sold to PAA on the day of departure of the first trial flight from Oslo, via Bergen and Tórshavn, to Reykjavik. From there PAA would fly the S-43 back to the USA and absorb it into its own fleet. Balchen and Norwegian S-43 mechanic Chris Braathen would be part of the mixed American-Norwegian crew for the flight.

For its part, PAA would do its utmost to continue the service from Reykjavik to New York, so Norwegian financial support for the coming years could be secured. The American airline had until August 15, 1936, to approve this agreement, but insisted on an alteration; it wanted a Danish crew member on board, to which DNL readily agreed. On July 29 Rudolf Olsen signed the contract. The August deadline passed and three days later Riiser-Larsen received the following distressing telegram:

"Reference program [sic] developed New York,

Looking considerably more modern than its contemporary, Valkyrien shares parking space with UK airline International Air Freight's Curtiss Condor G-AEZE at Amsterdam, where the S-43 was overhauled by Dutch airline KLM before being delivered to French shipping company Compagnie des Chargeurs Réunis in 1937.



THIS POSTMA COLLECTION VIA AUTHOR



although we were fully prepared [to] proceed with technical features of plan as outlined, regret cannot now proceed as we're unable in limited time [to] effect arrangements with other governments which would be satisfactory [for] all parties STOP Hoping [to] effect arrangements for program next year". The North Atlantic trial flights for 1936 were cancelled by PAA.

The Norwegians did not give up, however, and asked Cooper to come to Norway to discuss the trial services for 1937. He arrived in Oslo that February and met with Olsen, Riiser-Larsen and Balchen, but offered no further commitments. Pan American was willing to look into a possible purchase of the S-43, but in the end elected not to do so. The Norwegian airline was stuck with an amphibian for which it had no need. In 1937 it was operated on an Oslo—Stockholm service for a month, landing on the concrete runway at Stockholm's Bromma airport and alighting on the water near Oslo's Gressholmen seaport, but for the rest of the year it was little flown.

The company tried to sell it, with interest from The Netherlands and Switzerland, but no buyer was found until the spring of 1938, when DNL accepted an offer of \$90,000 from French S-43 operator *Compagnie des Chargeurs Réunis*. After a major overhaul in Amsterdam by KLM, the S-43 was transferred on September 14, 1938, from Amsterdam to Paris and then to Marseille, where the French registration F-AREX was applied. On the same day LN-DAG was deleted from the Norwegian civil register. It had accrued only 194 flying hours in Norwegian service.

The Norwegians continued with the North Atlantic dream. During 1939–40, Norway worked closely with the Swedish, Danish and Finnish to establish an agreement with PAA, with which the Nordic countries opened a New York—Bergen service with Boeing 314 Clippers on June 1, 1940. By that time, however, the Germans had invaded Norway, which capitulated on June 10. For now, the North Atlantic dream was over.



SIKORSKY S-43 DATA

Powerplant 2 x Pratt & Whitney S1EG Hornet radial engines, 750 h.p. each at 7,000ft (2,100m), driving three-bladed Hamilton Standard constant-speed propellers

Dimensions

Span	86ft 0in	(26.21m)
Length	51ft 2in	(15.6m)
Height	17ft 8in	(5.38m)
Hull length	50ft 3in	(15.31m)
Hull beam	90in	(2.29m)
Undercarriage track	11ft 2in	(3.40m)
Wheel diameter	45in	(114cm)
Tailwheel diameter	18in	(46cm)
Max chord	11ft 6in	(3.5m)
Dihedral	2°	
Tailplane span	22ft 6in	(6.86m)
Propeller diameter	11ft 6in	(3.5m)
Wing area	780ft²	(72.4m²)
Tailplane area	127.6ft²	(11.85m²)
Fin/rudder area	61.75ft²	(5.74m²)

Aerofoil

NACA 22 series

Weights

Empty weight	11,380lb	(5,162kg)
Useful load	7,620lb	(3,456kg)
Gross weight	19,000lb	(8,618kg)

Loading

Wing loading	24.34lb/ft²	(118.84kg/m²)
Power loading	12.67lb/h.p.	(5.75kg/h.p.)

Performance

Cruising speed		
at sea level	167 m.p.h.	(269km/h)
Max speed		
at 7,000ft (2,100m)	200 m.p.h.	(322km/h)
Stalling speed	65 m.p.h.	(105km/h)
Initial rate of climb	1,250ft/min	(381m/min)

BELOW One of several S-43 amphibians operated by *Compagnie des Chargeurs Réunis*, which formed its own airline, *Aéromaritime*, in the early 1930s, to operate scheduled services along the West African coast, from Dakar in Senegal to Pointe Noire in French Equatorial Africa (now the Republic of Congo).

HOWARD LEVY



Few copies left!

Few copies left!

Northrop Delta - AB Aerotransport

Rob J. M. Mulder

At the beginning of the 1930s, night mail services started to become more and more important for European airlines. Navigation and safety equipment had improved drastically and aircraft became much more economical to fly. The introduction of the fast Lockheed Orion by Swissair in April 1932 led to a true revolution within air transport. Everyone wanted aircraft that flew faster than their existing obsolete Fokker or Junkers aircraft did.

In Sweden, AB Aerotransport's Managing Director, Carl Florman, became interested in faster airliners as well. In 1933 he saw, during a visit to Norway, a Northrop Gamma and was interested in a similar aircraft for his airline. Offers were requested and through Northrop's representative, Norwegian aviator Bernt Balchen, AB Aerotransport ordered a passenger Delta 1C and a mail aircraft, the Delta 1E.

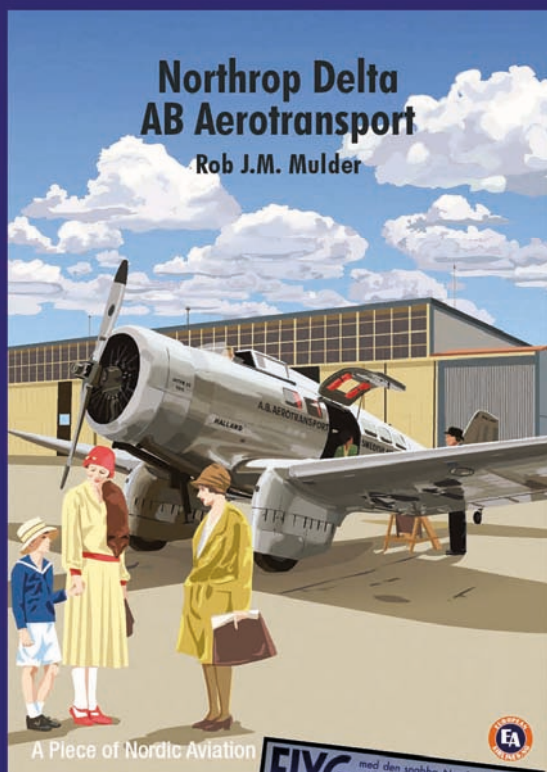
The operation of both aircraft was marked by problems and challenges for the pilots. It took them some time to master the aircraft. The Delta 1E never entered service, as it crashed on a trial mail flight. In 1937 AB Aerotransport sold the Delta 1C to Spanish airline Líneas Aéreas Postales Españolas — LAPE. It was in civil and military service until well after World War Two.

Following intensive research, the author describes in detail the history of the Northrop Alpha, Beta, Gamma and Delta (civil and military), as well as the operation of the two aircraft in service with AB Aerotransport, illustrated with many photographs, tables, drawings and colour artwork by Juanita Franzi, Mats Averkvist and Nils Mathisrud.

About the book: 21.5cm x 30.2cm, 176 pages, hard covers, 187 b/w photos, many tables, colour section with profiles. ISBN 978-82-93450-00-9

Prices: Kr. 200 + p.p. (approx. £ 20,-)

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Defending the Reich

Part 3: The SG 116 Zellendusche

In the concluding part of his series on the activities of Luftwaffe weapons specialist unit *Erprobungskommando 25*, **ROBERT FORSYTH** takes a look at the unit's experiments with the SG 116 *Zellendusche* — a battery of recoilless optically-triggered 30mm cannon fitted vertically into a fighter's fuselage to fire upwards into the belly of a USAAF bomber

IN THE SUMMER of 1944, as part of its continuing efforts to devise weapons with which to shoot down the Boeing B-17 Flying Fortresses and Consolidated B-24 Liberators of the USAAF's strategic bomber forces based in the UK and Italy, *Erprobungskommando 25* (E.Kdo 25 — Test Command 25), the Luftwaffe's specialist anti-bomber weapons development unit, worked with several leading German arms manufacturers on radical and technologically advanced forms of air-to-air armament.

The unit had been formed in northern Germany in April 1943 and by June 1944 was based at Parchim, an airfield roughly halfway between Hamburg and Berlin, under the command of *Hauptmann* Horst Geyer. The unit worked closely with the two test centres operated by the *Reichsluftfahrtministerium* (RLM — German Air Ministry) at Rechlin (aircraft) and Tarnowitz (armament). It was at Parchim that E.Kdo 25 undertook tests with the SG 116 *Zellendusche* (SG for *Sonder Gerät* — Special Apparatus; *Zellendusche* — Cell Shower), a recoilless single-shot 30mm-calibre weapon based around the barrel of an MK 103 cannon fitted to a breech block, which was intended to be fired upwards as an SG 116-equipped fighter passed below a bomber. Conventional fighter attacks against heavy four-engined bombers (or *Viermots* in Luftwaffe parlance) using machine-guns and cannon were usually mounted from behind or directly ahead of an enemy formation. In attacking from the rear, the fighter risked drawing the combined

defensive firepower of several 0.50in Browning machine-guns mounted in the bomber's dorsal turret, ball turret and tail and waist-mounted gun positions as it passed through the formation to make its exit. In attacking from the front, although the intensity of the defensive guns was not so strong (even allowing for the twin-gun Bendix "chin-mounted" turrets on the later B-17G), the combined closing speed of the fighter and the bombers, as well as the narrower and much more challenging target profile, meant that the chances of shooting down a bomber was often beyond the capability of all but the most skilful *Experten*.

The tactical logic behind the SG 116 was that by approaching from the front and below a target, the fighter could avoid the collective mass of a formation's defensive firepower, while the bomber's underside presented a much larger, and closer, target to hit. Furthermore, the technology incorporated into the weapon meant that aiming depended more on the sighting apparatus than the human eye and the skill of deflection shooting needed with conventional guns. Geyer recalled:

"The intention was to make a frontal approach, fly under an American bomber and release the shot, which was fired by means of an explosive charge built into the base of the tube designed to be mounted into the side of a [Focke-Wulf] Fw 190 fuselage. The intention was good, and the aiming technology impressive. We believed that with such a weapon we could inflict fatal hits on the bombers' wing fuel tanks."

The SG 116 was developed by Rheinmetall-



VIA AUTHOR

Borsig as a “reversed” progression of its 7.7cm SG 113A airborne recoilless anti-tank weapon, which comprised a vertically-mounted barrel, loaded with a 45mm armour-piercing shell, fitted into the fuselage or wings of an Fw 190. A radar installed in the aircraft would detect the echo impulse given off by a tank moving on the ground, which triggered the weapon. The shell would be fired downwards at the tank, with success at hitting the target assured at a range of 200m (650ft). The weapon had a high muzzle velocity because of the mass of its counterweight.

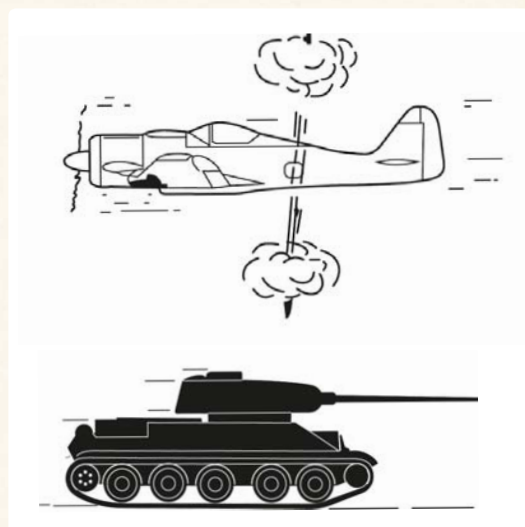
Anti-tank to anti-bomber

The RLM showed a keen interest in the weapon’s potential for other uses and a specification order was issued to Rheinmetall-Borsig to develop a similar weapon for anti-bomber work. This was to be of 30mm calibre, firing a shell with tracer at a velocity of 860–900m/sec (2,820–2,950ft/sec). Tactically, it was envisaged that an Fw 190 would take up a position directly astern of a bomber (apparently regardless of defensive fire from the latter’s tail gunner), attempting at the last moment to fly immediately below the bomber and within 50m (160ft) of it. When it was suggested by Allied intelligence officers to a former pilot of E.Kdo 25 that this represented a rather dangerous tactic, the German replied that the SG 116 was viewed as being “in the nature of an inventor’s experiment”.

The resulting weapon was developed in a very short time using stocks of MK 103 cannon

ABOVE Hauptmann Horst Geyer, commander of Erprobungskommando 25 (E.Kdo 25), the Luftwaffe’s specialist anti-bomber weapon testing and evaluation unit, talks with his officers. Geyer had flown with fighter unit Jagdgeschwader 51 during the Battle of Britain and was later involved with the operational acceptance trials of the Heinkel He 162. The author interviewed Geyer at his home in Ahrensburg in 1990.

BELOW The SG 113A was conceived as an aircraft-mounted anti-tank weapon, the upper-facing surfaces of a tank being the most vulnerable — and the hardest to score a direct hit on from an aircraft approaching at an oblique angle. A radar-activated electro-magnetic cell would trigger the recoilless cannon.



MAAGIE NELSON



ABOVE Luftwaffe armoureders load the ammunition for an MK 103 cannon fitted to a Henschel Hs 129. The MK 103 was intended principally for combat at ranges beyond 1,000m (3,300ft) and was considered good for operations against enemy bombers. It was the most sophisticated of the 30mm range of weapons used by the Germans.

barrels. The Rheinmetall-Borsig MK 103 was a 30mm automatic gas-operated air-cooled belt-fed aircraft cannon. The gun had an official rate of fire of 420–450 rounds per minute, and, although attempts were made to increase this to 600 rounds per minute, such efforts resulted in poor performance and damage to several parts.

The SG 116 consisted of a rifled MK 103 barrel without a finished chamber, into the breech block of which was fitted an electronic detonating device. The breech block was connected to the barrel by means of threads and secured against rotation by a spring. The complete round consisted of the 30mm shell, a cardboard case in which was loaded the propulsion charge, a contact ring (which connected to the detonating device) and a counterweight. Three barrels were to be fitted on the port side of the fuselage of an Fw 190, the forward barrel being just aft of the point where the rear of the cockpit joined the fuselage when the canopy was closed. The distance between each barrel was about 15cm (6in). The barrels pointed aft, but were slightly displaced from the parallel, the furthest forward being set at an angle of 74°, the next at 73° and the third at 72.5° to the horizontal axis of the aircraft. They projected about 50cm (20in) above and 25cm (10in) below the fuselage. In most cases where this arrangement was installed, the fighter's two outer-wing 30mm cannon were removed.

After being activated by the automatic firing mechanism the charge was ignited, propelling the shell and counterweight in their opposite directions. By regulation of the travel with the differential in weight, recoil was avoided as the shell and the counterweight left the weapon simultaneously. The weapon was to be activated and fired automatically using a

photo-electric cell, or *Magisches Auge* ("Magic Eye"), developed under the supervision of Dr P. Hackemann and Dr R. Schwetzke of the *Institut für Waffenforschung* (Weapons Research Institute) at the *Luftfahrtforschungsanstalt* (Aircraft Research Institute) *Hermann Goering* in Braunschweig.

This optical device was built into the fuselage immediately forward of the barrels and comprised four reduction lenses placed one below the other, with a photo-electric cell fitted to the lowest lens. This was connected to a solenoid on which a contact arm functioned. When the photo-electric cell was activated by an image in the lens, the solenoid was energised and the circuit to the barrel-firing gear completed. The diameter of the external part of the Magic Eye was 8cm (3in). The maximum range from the target aircraft at which the Magic Eye was sufficiently sensitive to operate the firing gear was around 55m (180ft).

Trial begin

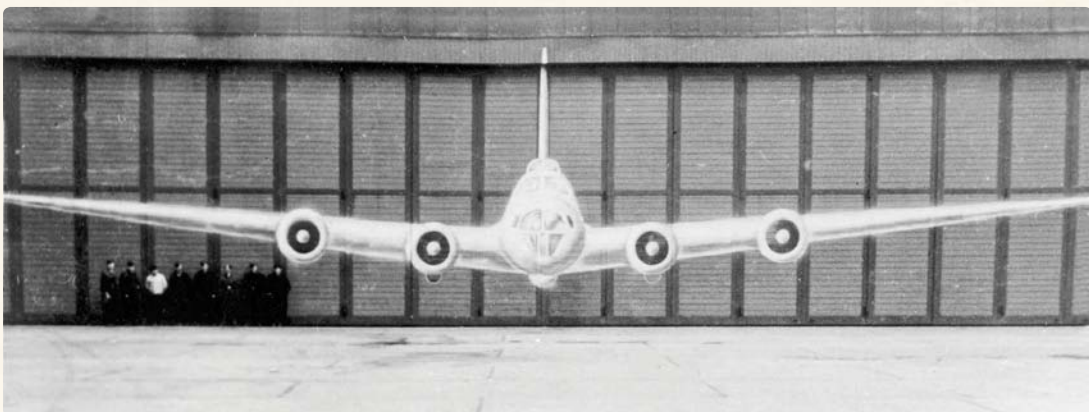
In late June/early July 1944 E.Kdo 25 began trials with the weapon at Parchim. Geyer recorded:

"On July 1, 1944, *General* [Adolf] Galland, the commander of our fighter forces, and some of his staff made an inspection trip to Parchim and we demonstrated the weapon using an Fw 190 fitted with three such tubes mounted immediately behind the cockpit, each loaded with a 30mm mine shell. We put an NCO pilot into the specially rigged fighter and arranged for an Fw 58 *Weihe* to fly simultaneously overhead, about 200m [650ft] above the Fw 190.

"The *Weihe* was to tow a target drogue. The Fw 190 flew in very low, about 100m [330ft], so that we on the ground could observe the weapon being used to its full effect. In the interests of safety, and because the Fw 190 was not a large



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VIA AUTHOR



VIA AUTHOR

TOP RIGHT & LEFT Three Focke-Wulf Fw 190s were used to test the SG 113A anti-tank weapon system, two launchers per wing being installed to fire downwards. Perhaps unsurprisingly, the system was found to be cumbersome and inaccurate and was never used in action.

ABOVE The Jagdflieger defending the skies over the Fatherland during 1943–44 were never allowed to forget their prime enemy. Here, a life-size frontal view of a B-17 has been painted on to hangar doors for gunnery training. The line-up of mechanics to the left lends a sense of scale.

LEFT Major Georg Christl, E.Kdo 25's commander from July 1944, is seen here furthest left in field cap. Christl took command of the unit when Horst Geyer, furthest right talking to Adolf Galland (in long coat), was posted to experimental jet unit E.Kdo 262.



ABOVE The three 1.6m (5ft 3in)-long 30mm cannon barrels of an SG 116 Zellendusche automatic recoilless anti-bomber device installed in the fuselage of Fw 190 "White 11" in mid-1944. If a mass is discharged to the rear of a gun at the same instant that a shell is fired forward from the barrel, the reaction of one will balance out the other.

aircraft, we developed a firing system designed to allow the pilot to fire only one tube at a time, thus minimising and avoiding the risk of any blast damage from all the tubes firing at once. Unfortunately, however, the NCO made a mistake and fired all the tubes simultaneously.

"There was a loud explosion in the air with a huge cloud of smoke. Then, emerging from the smoke came the Weihe, flying gracefully on, undamaged. However the Fw 190 was destroyed in the process. Fortunately the pilot got out; but, like the Weihe, the drogue was also untouched. The pilot of the Fw 190 landed by parachute and limped up to Galland and me. He pulled off his flying helmet and his first words were 'Permission to have a cognac, Herr General!'".

In July 1944 Geyer departed E.Kdo 25, his position as *Kommandoführer* being taken by Major Georg Christl, a Knight's Cross-holder who had previously commanded the Messerschmitt Bf 110-equipped III./ZG 26. By the beginning of August, E.Kdo 25 had been redesignated *Jagdgruppe 10* (J.Gr.10 — Fighter Group 10). The unit, as with E.Kdo 25, was listed as comprising a *Stab* flight and three *Staffeln*, and had a nominal strength of 52 aircraft, although whether this strength was ever reached is debatable.

By August 22, 1944, J.Gr.10 had commenced

fitting the photo-electric cell, which, by that time was under manufacture as the *Wurzen* by the *Hugo Schneider Aktiengesellschaft Metallwarenfabrik* (HASAG) in Leipzig, into 19 of its Fw 190s at Tarnowitz. Trials were also conducted using a Heinkel He 177 of the *Kampfstaffel* (Bomber Squadron) as a "target", but these proved unsuccessful and, for the time being, further development was dropped while the various parties involved in the weapon's manufacture went back to the drawing board. By September 18 the same year the decision had been taken not to use the SG 116 operationally until greater accuracy could be assured, although the fitting of the optical devices was nearing completion.

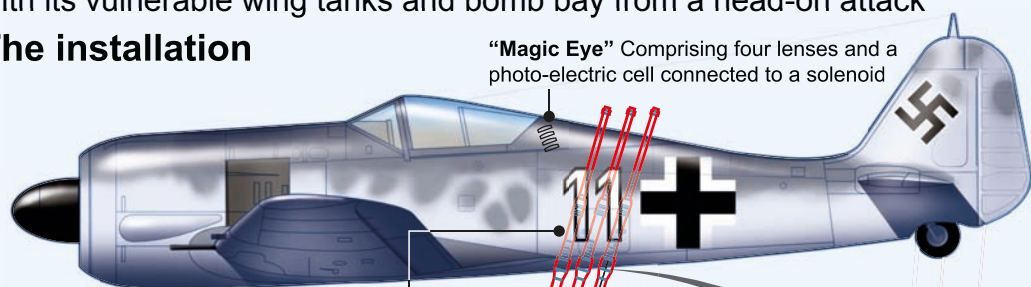
On September 26, 1944, the commander of the RLM's Technical Office calculated that in a pass below a bomber at 50m (160ft) a fighter equipped with five SG 116 barrels could achieve three hits on its target. He further calculated that if 12 barrels were fitted to a Messerschmitt Me 262 jet interceptor, a type which had recently made its operational debut in the West with E.Kdo 262 (to which Horst Geyer had been posted as commander), then a pass at 50m would ensure 12 hits, and six hits at 100m (330ft).

In his monthly work report for September 1944, Christl admitted that the automatic triggering

The SG 116 Zellendusche ("Cell Shower")

An attempt to solve the problem of targeting a bomber's exposed underside with its vulnerable wing tanks and bomb bay from a head-on attack

The installation

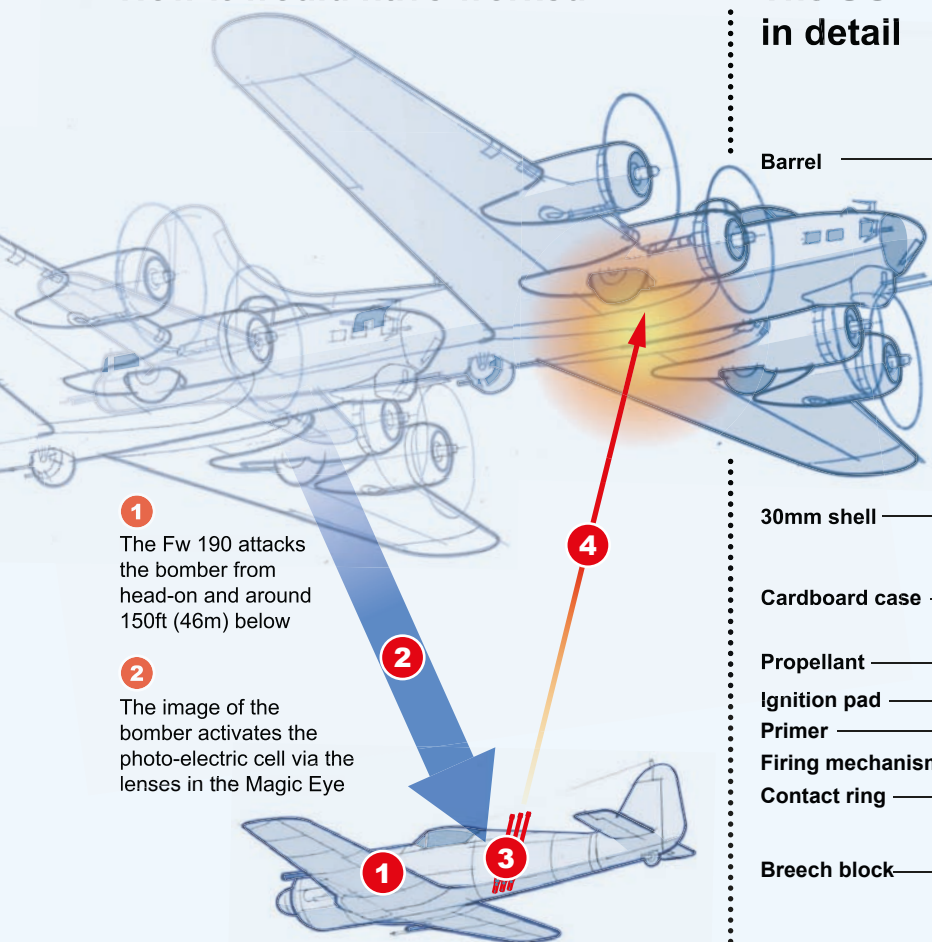


SG 116 Fw 190s were adapted to carry three of the single-shot recoilless cannon

"Magic Eye" Comprising four lenses and a photo-electric cell connected to a solenoid

72.5°
73°
74°

How it would have worked



1
The Fw 190 attacks the bomber from head-on and around 150ft (46m) below

2
The image of the bomber activates the photo-electric cell via the lenses in the Magic Eye

3
This energises a solenoid, completing the circuit to fire the weapons

4
The weapons are positioned so that their shells impact the bomber at its most vulnerable points

The SG 116 in detail

Barrel

30mm shell

Cardboard case

Propellant

Ignition pad

Primer

Firing mechanism

Contact ring

Breech block

Counterweight
Ejected downwards on firing, absorbing recoil

Graphic: Ian Bott www.ianbottillustration.co.uk



ABOVE A *Flying Fortress* opens its bomb doors to deliver another devastating load on the German homeland, this time Cologne, during a raid by more than 1,000 USAF bombers on January 7, 1945. By this time the Allied bomber forces were operating over the Reich with very little resistance from a critically weakened Luftwaffe fighter force.

device of the *Zellendusche* was not proving reliable. However, in ground tests it was found that when fired at a wing salvaged from a crashed B-17 from a range of 60m (200ft), the equipment and detonator functioned correctly, at a velocity of 845m/sec (2,770ft/sec).

In the air, tests using the SG 116 were conducted against an Fw 58 and an He 177 which had been equipped with specially constructed automatic steering devices. At a predetermined point the pilots of the aircraft baled out and the aircraft flew on unmanned, at which point the Fw 190s attacked at an altitude of 1,000m (3,300ft) against the Focke-Wulf and at 6,000m (19,700ft) against the Heinkel. It was noted that problems arose at heights in excess of 6,000m, at which point the automatic triggering device became too sensitive, prone to premature and random firings. The *Weihe* was hit and damaged, but the Heinkel flew on undamaged and is thought to have crashed into the Baltic as planned. The results in the air varied wildly with the optimistic results calculated by the Technical Office.

Gearing up for action

By the end of the first week of October 1944, 18 of J.Gr.10's Wurzen-fitted Fw 190s had returned to the Gruppe's base at Parchim from the *Erprobungsstelle* [Test Establishment] at Tarnewitz, where the circuitry work was completed. One machine remained at Tarnewitz, along with one of the E-Stelle's Focke-Wulfs, which were to take part in further firing trials against a Heinkel 177. These resulted in only one Fw 190, equipped with five barrels, firing two shots, both hits, but with three barrels suffering misfires. The other Fw 190 remained earthbound owing to technical faults.

Trials continued until the end of December 1944, seeing the introduction of a series of revisions and enhancements to the weapon and its firing system, but nothing more materialised in terms

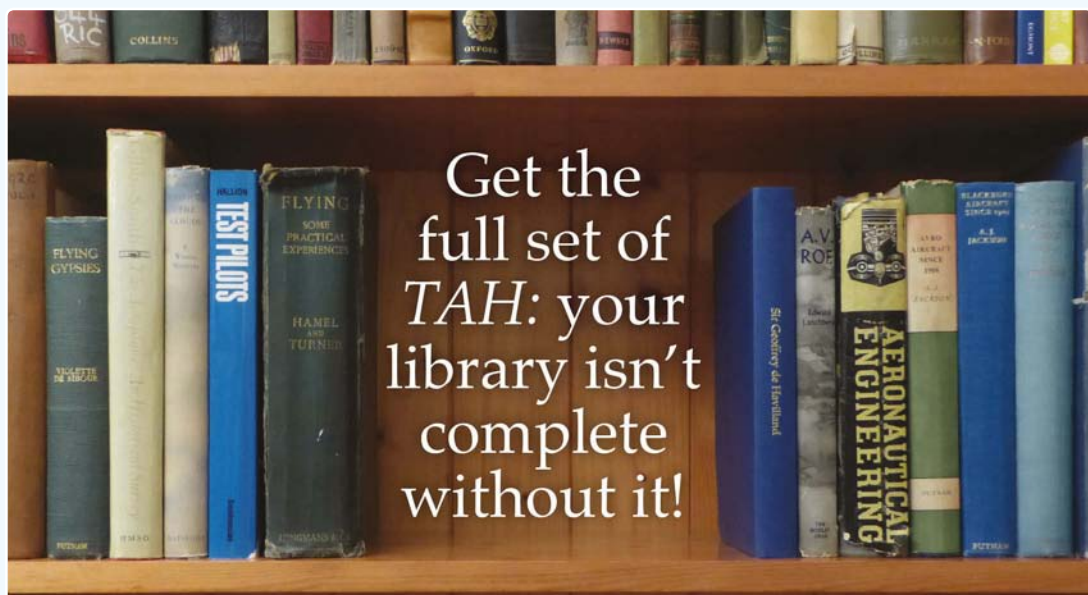
SG 116 *Zellendusche* data

Calibre	30mm (1.2in)
Muzzle velocity	860m/sec (2,822ft/sec)
Muzzle velocity of counterweight	200m/sec (656ft/sec)
Weight of weapon	28kg (62lb)
Length of weapon	1,600mm (63in)
Weight of projectile	315g (11oz)
Length of projectile	140mm (5½in)
Weight of explosive	72gm (2½oz)
Weight of counterweight	1.35kg (2.98lb)
Weight of complete round	1.8kg (4lb)
Firing system	Electrical
Type	High-explosive

of operationally ready equipment. By that stage of the war the Allied air forces had established air supremacy over what remained of the Western Front, and the USAAF's bomber groups and their fighter escorts were operating with increasing impunity over the Reich. In reality, JG 10 (the unit had, on paper, been upgraded from a *Gruppe* to a *Geschwader*) was little more than an *Einsatzschwarm* (small operational section of aircraft), although it continued to test a variety of equipment and armament. It moved successively to Erfurt-Bindersleben, Langensalza, Finsterwalde, Jüterbog-Waldlager, Delitzsch (near Bitterfeld) and Salzwedel.

By April 1945, what remained of JG 10 had assembled at Redlin. From there, the unit's flying and technical personnel journeyed by road south, heading for Schöngau in Bavaria, which they reached in the last few days of the war to await surrender to the US Army. In early May, those elements which remained at Redlin took off in the direction of Lübeck, but were captured before they had reached Schwerin.





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Monsieur Moineau's Monstrosity

The Salmson-Moineau SM-1

As the first major conflict in which flying machines played a significant part, the First World War saw the development of numerous obscure and unusual aircraft, many of which subsequently disappeared into oblivion — and for good reason.

ALAIN J. PELLETIER traces the career of one such French machine fitted with a decidedly odd “sideways-mounted” engine

ON JANUARY 2, 1911, having obtained a masters degree at Nancy University, 24-year old René Joseph Louis Moineau found a position as a draughtsman at the Louis Breguet factory at Douai in northern France. He did not stay in the job for long, however, as on June 20 that year he obtained his pilot's licence, No 544, and accepted a job as a test pilot for Breguet.

From then on Moineau took part in numerous aerial contests and meetings in various locations, including Douai, Reims, Deauville and Monaco, at which the intrepid young pilot took the opportunity to set a handful of new records. At Douai on August 17, 1911, for example, he set a new altitude record (although it was never officially ratified by the *Fédération Aéronautique Internationale*) of 876m (2,875ft) with two passengers in a 100 h.p. Breguet. On September 12 the same year he completed a 450km (280-mile) flight between Douai and Vesoul with two passengers and their luggage in 4hr 41min. He secured second place at the 1911 *Aéronautique Militaire* contest, and in 1913 took first place in the Grand Prix de Monaco in a 100 h.p. Salmson Canton-Unné-powered Breguet biplane.

With the outbreak of war in Europe, Moineau was recruited into the military on August 2,



RIGHT René Louis Joseph Moineau was born in Lisieux, Normandy, on August 11, 1887, and became a draughtsman for Breguet in January 1911. The same year he qualified as a pilot and accepted a position with Breguet as a test pilot. He did well for the company, securing the sale of six Breguet biplanes as a result of coming second during the French military aircraft trials at Reims during October–November 1911, at which he is seen here.

BnF-GALLICA VIA AUTHOR



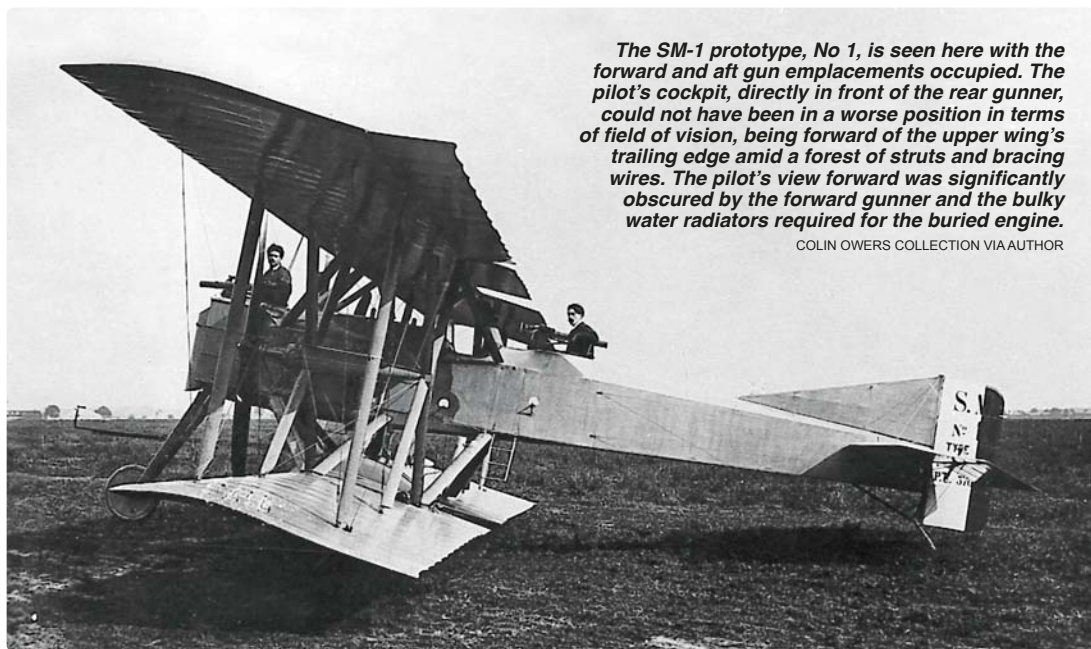
BELOW The unmistakable shape of the Salmson-Moineau SM-1 and its unusual transverse-mounted Salmson water-cooled radial engine is seen to good advantage in this excellent photograph of a factory-fresh example awaiting delivery. This may be a later production machine, as the exhaust pipe runs aft horizontally from the exhaust collector ring rather than up and over the top wing as on most SM-1s.

COLIN OWERS COLLECTION VIA AUTHOR



The SM-1 prototype, No 1, is seen here with the forward and aft gun emplacements occupied. The pilot's cockpit, directly in front of the rear gunner, could not have been in a worse position in terms of field of vision, being forward of the upper wing's trailing edge amid a forest of struts and bracing wires. The pilot's view forward was significantly obscured by the forward gunner and the bulky water radiators required for the buried engine.

COLIN OWERS COLLECTION VIA AUTHOR



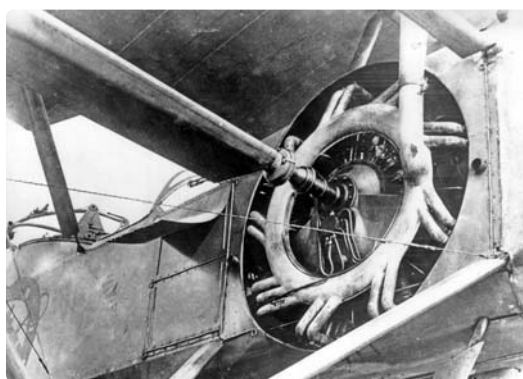
1914, and attached to the 2^{ème} Groupe d'Aviation, stationed in Dijon, but repeatedly asked to be posted to a front-line combat unit. Eventually his request was fulfilled when he was sent to Escadrille Br.17, at that time flying Breguet 14 biplane bombers.

From February the following year, having served with Br.17 and *Aviation Navale* at Dunkerque, Moineau went successively to Chalais-Meudon, Avord and Paris, where he was recruited as a test pilot. There, with the help of the French engine manufacturer Chenu, he designed and built his first powered aeroplane.

KEEP AN EYE ON THE SPARROW

In 1915 the aptly-named self-made aeronautical engineer (Moineau means sparrow in French) had the opportunity to show French engineer and manufacturer Émile Salmson his design for a three-seater biplane. Salmson was then in the process of expanding his activities, which were growing rapidly. At the Russian government's request, Salmson was considering opening a 22,000m² (237,000ft²) subsidiary factory in the Moscow area. During the opening months of 1916, the Moscow factory was erected and immediately started production of aircraft powered by Salmson engines, another 20,000m² (215,000ft²) factory following shortly thereafter.

But Salmson was an energetic man, always on the lookout for new projects. With the Russian adventure well under way, Moineau's proposal arrived just in time to catch Salmson's attention. The big biplane designed by Moineau was to be designated SM-1 (Salmson-Moineau No 1) by the Army but was given the designation A92H by the company. The three-seater was arranged so



VIA AUTHOR

ABOVE The Salmson 9 A2C nine-cylinder water-cooled radial engine was fitted in the starboard side of the SM-1's fuselage, with its crankshaft perpendicular to the aircraft's longitudinal axis. This example has the more commonly fitted exhaust pipe leading off the forward section of the collector ring to be carried up over the wing and ejected into the slipstream.

that the pilot was accommodated midway along the fuselage near the aircraft's centre of gravity, under the upper wing, an arrangement which severely limited his field of vision. A gunner/observer was positioned at the nose, and a rear gunner was situated directly behind the pilot. Both the upper and lower wings adopted a rectangular planform, large ailerons being fitted to the top wing only.

The bulky SM-1 also incorporated some unusual features, the oddest of which was the engine arrangement, in which a single water-cooled radial engine (using the Canton-Unné system) drove two large two-bladed fixed-pitch wooden propellers mounted between the wings.

The tenth production SM-1 awaits its next flight in the early morning sunshine in the company of a Farman biplane and, interestingly, a German Albatros. Ailerons were incorporated in the top wing only, aft of the inverted-vee kingposts which braced its outer sections, the upper wing's span being greater than the lower.

COLIN OWERS COLLECTION VIA AUTHOR



The engine itself was buried in the fuselage forward of the pilot so that the crankshaft axis was perpendicular to the aircraft's longitudinal axis. This apparently peculiar layout was actually fairly common at the time and several designers had already experimented with such an arrangement in their machines, including Clément Ader's Éole, the Wright Flyer, the Vendôme biplane, Short T.3 Triple Twin, DFW R I and others.

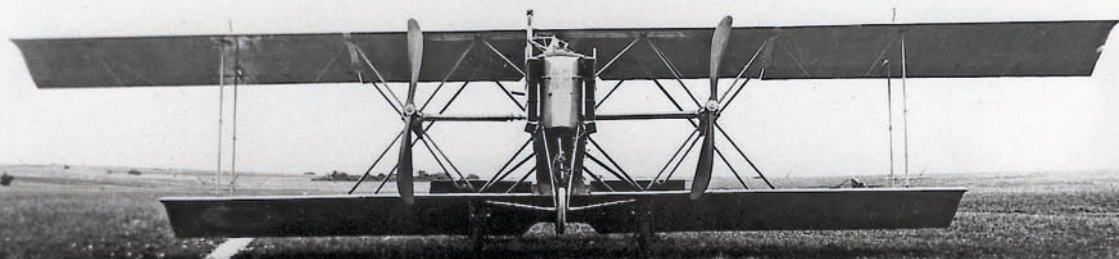
The concept presented both advantages and disadvantages. The former included the fact that the observer was installed well forward and benefited from an unobstructed field of vision. The use of two counter-rotating propellers — one rotated clockwise, the other anti-clockwise — obviated the gyroscopic effect usually induced by a single propeller or two propellers turning in the same direction. As far as drawbacks were concerned, the most irksome was that the engine was installed in

such a position (i.e. buried in the fuselage) that it needed a highly efficient cooling system. This was achieved by means of a pair of two bulky — and thus heavy — square-section water radiators installed at an angle either side of the nose, which of course required all the necessary tubing linking them to the engine. The radiators more than doubled the fuselage cross-section, to the obvious detriment of the aircraft's performance, particularly its maximum level speed.

Consequently, the advantage generated by a centrally-positioned engine was outweighed — literally — by the considerable bulk of the radiators, and further reduced by the weight of the front observer with his machine-gun and ammunition drums. Unsurprisingly, the SM-1 was very nose-heavy, and likely to overturn when landing on muddy or unprepared airfields. To avoid such incidents, it was fitted with a crude nosewheel arrangement (adding even more weight to the forward end), which proved

BELOW *A rigger's nightmare — this front view of a newly-built SM-1 emphasises the type's lack of aerodynamic refinement owing to the numerous mainly cruciform struts and extensive wire bracing. Also of note is the minimal ground clearance of the lower wing, which must have caused handling headaches on rough or marshy airfields.*

COLIN OWERS COLLECTION VIA AUTHOR



As seen here on SM-1 No 19, the port side of the SM-1's fuselage incorporated cooling louvres for the starboard-mounted Salmson engine. The tapered fuselage, mid-mounted between the wings, was flat-sided with rounded upper deckings and lower forward decking. Note the ungainly nosewheel fitted to spindly struts, to help prevent nose-overs.

ECRA VIA AUTHOR



to be extremely fragile and broke frequently.

To function properly, the SM-1's Salmson 9 A2C engine variant had to be modified by lengthening the crankshaft at both ends so that it could be connected on each side to the long driveshafts turning the propellers. Furthermore, the engine had to be offset to the starboard side of the fuselage, requiring the driveshafts to be of different lengths; the starboard shaft was 1.65m (5ft 5in) long while the port shaft was 2.14m (7ft ¼in) in length, resulting in an asymmetrical layout. Each shaft was linked to its propeller shaft by means of a right-angled reduction gearbox, which was located in the middle of a pair of crossed struts.

The quite shallow fuselage "floated" midway between the wings and was maintained in position by a forest of streamlined struts for maximum rigidity, which added more weight and drag to the whole structure. Indeed, the perfect rigging of an SM-1 must have been a tough and painstaking job for mechanics, owing

to the numerous struts and wires which had to be negotiated, and to the vibrations and torsional forces that had to be withstood by the rotating and vibrating shafts. It is highly probable that deformations of the airframe had to be corrected after each flight.

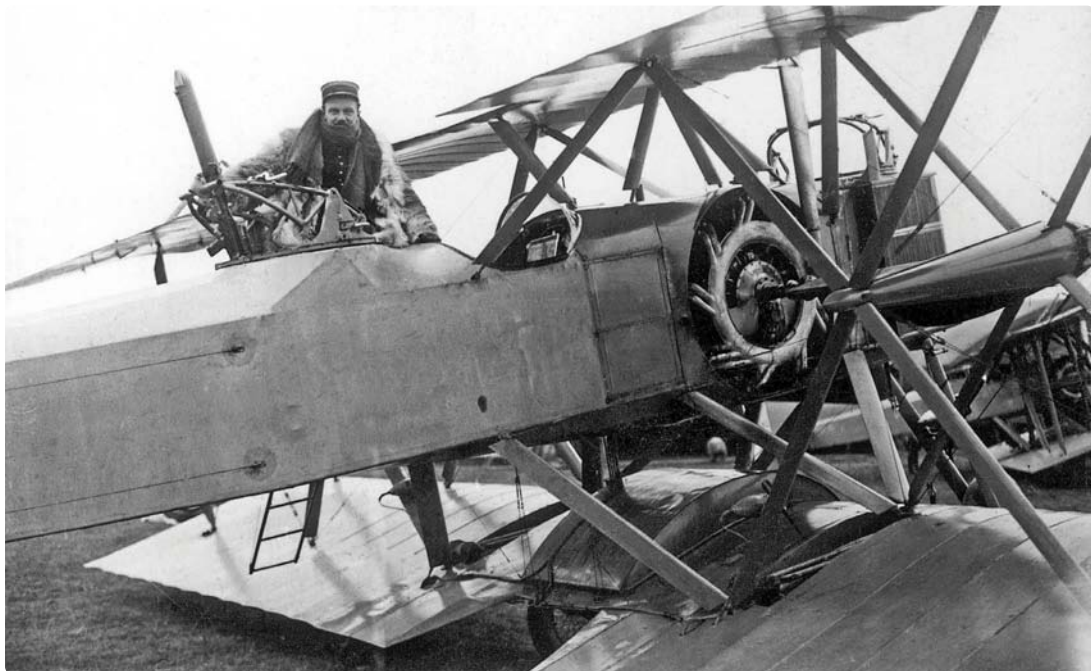
A SHORT SERVICE LIFE

As originally designed, the SM-1's armament was to be two Ateliers de Puteaux 37mm cannon mounted on Scarff rings, but this kind of gun was not selected by the French air forces and the SM-1 was armed with 0.30in machine-guns instead and operated as a long-distance reconnaissance aircraft. Despite its shortcomings, the SM-1 passed two series of flight tests with the *Service Technique Aéronautique* (STAé) at Villacoublay, south-west of Paris, in October 1916 and February 1917. One can only conclude that these tests were successful enough on both occasions, since a first production run of 100 examples was ordered on November 11, 1916.

BELOW *A rare photograph of a line-up of SM-1s, possibly taken at the Salmson factory airfield at Boulogne-Billancourt, a western suburb of Paris, or at an aviation depot pending their delivery. The type's serviceability was poor, Escadrille F.63 grounding its three examples a total of ten times during December 1916 and January 1917.*

MAE VIA AUTHOR





In his report on French three-seater aircraft, (TNA document ref AIR1/1084/204/5/1718), dated August 21, 1917, Major Sewell of the British Royal Flying Corps wrote:

"The principal disadvantage of these large aeroplanes has so far proved the difficulty of getting them out of their sheds on muddy grounds. So serious was this during the winter of 1916–17 that the Salmson-Moineau SM-1s and some Caudron R-4s were practically unused for six months or more".

This is confirmed by the few daily reports that have survived. During December 1916 and January 1917 the three SM-1s operating alongside the Farmans of Escadrille F.63 from Pierrefonds airfield (Oise) were either unavailable or under repair, while at Rémy airfield a few SM-1s of Escadrille F.19 were eagerly awaited. It seems that the Salmson-Moineaus remained on operational status for only a few months.

As for total production, it is estimated to have reached at least 155 aircraft, this being the highest serial number found on available photographs. These partly equipped up to 11 French escadrilles and were operated alongside Farman F.40s (Escadrilles F.2, F.19, F.41, F.45, F.58, F.63, F.71, F.72 and F.223), Caudrons (Escadrille C.219), and Dorands (Escadrille AR.289).

From the archives it appears that the Moineau machines were not much loved, as revealed by the following, found in an Escadrille F.19 report:

"At Reims F.19 also operated the SM-1 for aerial photography. Powered by two propellers driven by a single motor through a complicated mechanism, this 'plane was dangerous, under-

ABOVE *Wrapped up in a thick fur coat, a French gunner prepares for a long, cold SM-1 sortie at (relatively) high altitude. Of note is the aerofoil-shaped main fuel tank between the lower wings; a pair of pumps fed the fuel up into a gravity tank, which then fed the engine. Again, the limited ground clearance of the lower wing is noticeable in this image.*

powered and on the verge of being inadequate. It did not forgive any fault from its pilot."

In 1917 the Russian General Directorate of the Air Fleet (*Glavnoye Upravleniye Vozdushnogo Flota*) purchased two SM-1s from the French for evaluation, including No 95. These were tested at Khodynka airfield near Moscow, but, unsurprisingly, the results were disappointing. According to some sources, one of the SM-1s was allocated during the summer of 1918 to the so-called "Kaluga Air Group" (*Kaluzhskoy Aviagruppy*), part of the Red Air Fleet (*Krasnogo Vozdushnogo Flota*), which fought alongside White Russian forces in the Ural region. Other sources claim that the French Air Staff tried to get rid of some 50 unwanted Salmson-Moineaus by offering them to Russia, but without success, and that only the two SM-1s reached the Russian Air Force, with which they conducted preliminary service tests before being deemed unsatisfactory, as mentioned above.

On November 19, 1916, French Minister of War Pierre Roques wrote to *Capitaine de Vaisseau* Acton, naval attaché at the British Embassy and President of the British Aviation Commission (TNA document ref AIR1/1141/204/5/2322), stating the following:

"I have the honour to inform you that 50 Salmson-Moineau aeroplanes with 50 Canton-

Unné A2C motors ordered on behalf of the Russian government have not been able to be delivered in time for despatch via Arkangelsk before the stoppage of navigation. I should be obliged if you inform the British Government of this and ask them if this material can be utilised, in whole or in part, either by the Admiralty or the War Office. It is at present partly ready and will be totally so in a very short time.

"I would add that we have at present on order a certain number of machines and engines of this type. They are three-seater machines with two propellers and have an entirely free field of fire to the front and rear. They are going to be used on the front and will be used for [artillery] range-finding.

"Lastly, I would inform you that during the last trials made a fortnight ago by the STAé, the SM-1 aeroplane gave the following results: climb to 2,000m [6,600ft] in 21 min 20 sec, and 130km/h [81 m.p.h.] at 2,000m at 1,350 r.p.m."

Five days later, the British briefly answered that the Expeditionary Forces did not require the Salmson-Moineau machines.

FLYING THE SM-1

For those flying the SM-1, the manufacturer's recommendations set down in the operating manual were somewhat prescriptive. On the ground the aircraft had to be taxied at a minimum speed of around 30km/h (19 m.p.h.), otherwise neither propeller was able to affect the rudder. This speed also had to be reached for the tailskid to be lifted off the ground, thus enabling take-off. The nosewheel was only for safety, and was never to be used on hard ground. In order to take off, the fuselage had to achieve a horizontal position with minimal use of the stick until take-off speed was reached, at which point the stick had to be pulled gently. A hard pull on the stick had no discernible effect on the climb.

As its manufacturer claimed, the SM-1 had the advantages of efficient controls and good balance providing (nearly) automatic stability. In flight the fuel level was indicated by a small glass tube in which the fuel flow could be seen. It remained at a constant level as long as there was fuel in the main tank and one of the two Astra pumps was functioning. If the level dropped, only the small auxiliary gravity tank still contained fuel; essentially, at that point the pilot had only 45lit (10gal) left, enough for about 45min of flight. When no fuel at all showed in the glass tube this meant that there were only 15lit (3¼gal) left. When full, the main tank and the auxiliary gravity tank permitted a 4hr flight.

A good glider, the SM-1 could be flown down to the ground very gently, and landing had to be made on the two mainwheels, after which the

SALMSON-MOINEAU SM-1 (A92H) DATA

Powerplant 1 x Salmson Canton-Unné 9 A2C nine-cylinder single-row water-cooled radial piston engine of 240 h.p. at 1,350 r.p.m., with a displacement of 4.1lit (250in³)

Engine power loading 1.83kg/h.p. (4.03lb/h.p.)

Aircraft power loading 8.7kg/h.p. (19lb/h.p.)

Dimensions

Span		
(upper wing)	17m	(55ft 9in)
(lower wing)	12m	(39ft 4½in)
Length	10.5m	(34ft 5½in)
Height	3.5m	(11ft 6in)
Wing area	74m²	(804ft²)
Wing chord	2.5m	(8ft 2½in)
Wing loading	28kg/m²	(5.62lb/ft²)

Weights

Empty	1,512kg	(3,333lb)
Loaded	2,050kg	(4,520lb)
Useful load		

petrol and oil	160kg	(353lb)
crew	240kg	(529lb)
armament	100kg	(220lb)
miscellaneous	30kg	(66lb)
Total	530kg	(1,168lb)

Take-off weight	2,042kg	(4,502lb)
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Performance

Maximum speed		
at sea level	132km/h	(82 m.p.h.)
Maximum speed		
at 2,000m (6,600ft)	131km/h	(81 m.p.h.)
Maximum speed		
at 3,000m (9,900ft)	122km/h	(72 m.p.h.)
Climb to 2,000m	19min	
Climb to 3,000m	39min	
Service ceiling	4,000m	(13,000ft)
Endurance	2hr 30min	

Armament 2 x 0.30in machine-guns + 6–9 x 120kg (265lb) bombs

Price

without engine	45,700 francs
with engine	70,000 francs

Source: STAé & *Commisson d'Examen des Avions et Moteurs Nouveaux*, November 29, 1918

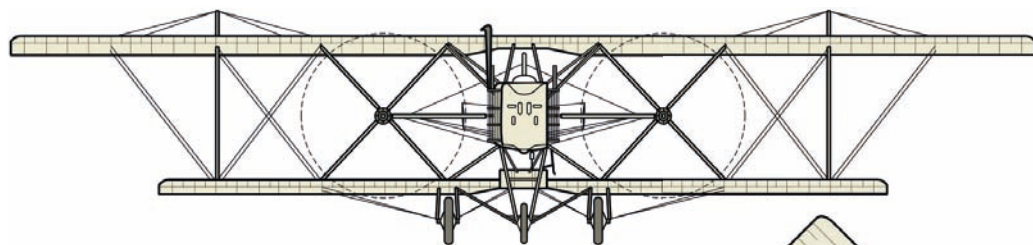
The SM-1 was not René Moineau's only aircraft design; his other types, none very successful, are listed below in chronological order:

1909 Two Chanute-type gliders

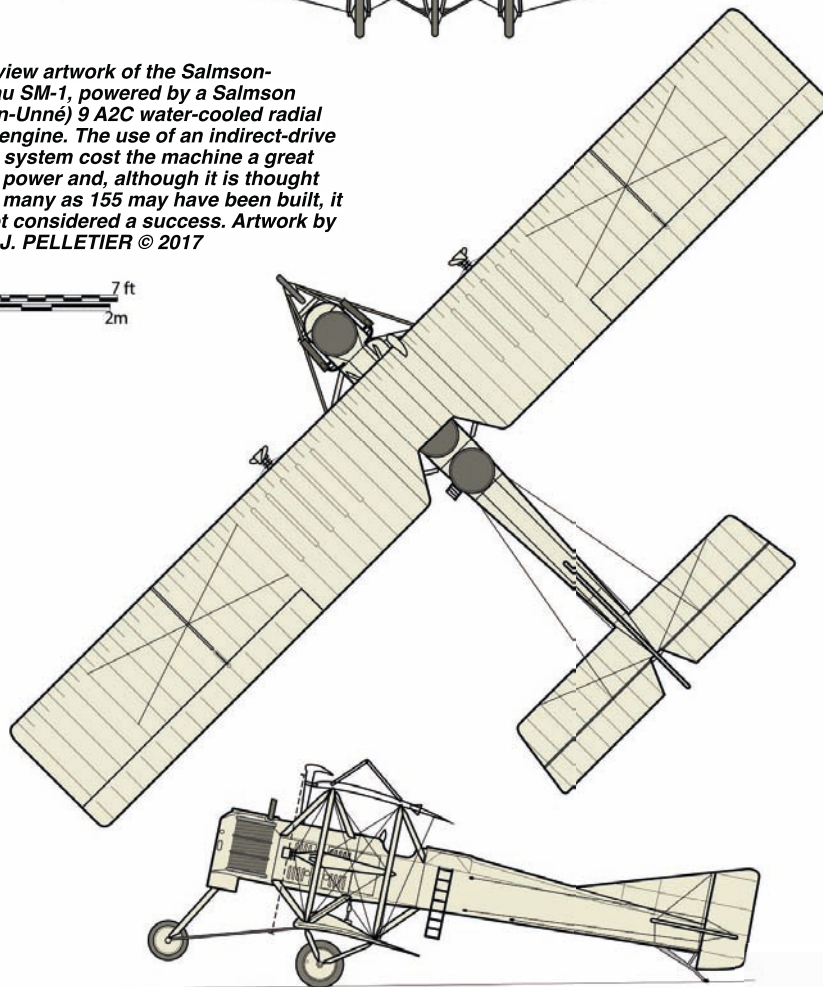
1915 Two-seat observation biplane; Chenu engine

November 1918 C1 monoplane fighter powered by 260 h.p. Chenu or 300 h.p. Hispano-Suiza; rejected by French Army. Gull-type wing span 16.7m (54ft 9½in); estimated endurance 2hr 30min; max speed unknown. Armament 2 x 0.30in Vickers MGs

1919 Single-engined racing aircraft displayed at



Three-view artwork of the Salmson-Moineau SM-1, powered by a Salmson (Canton-Unné) 9 A2C water-cooled radial piston engine. The use of an indirect-drive geared system cost the machine a great deal of power and, although it is thought that as many as 155 may have been built, it was not considered a success. Artwork by ALAIN J. PELLETIER © 2017

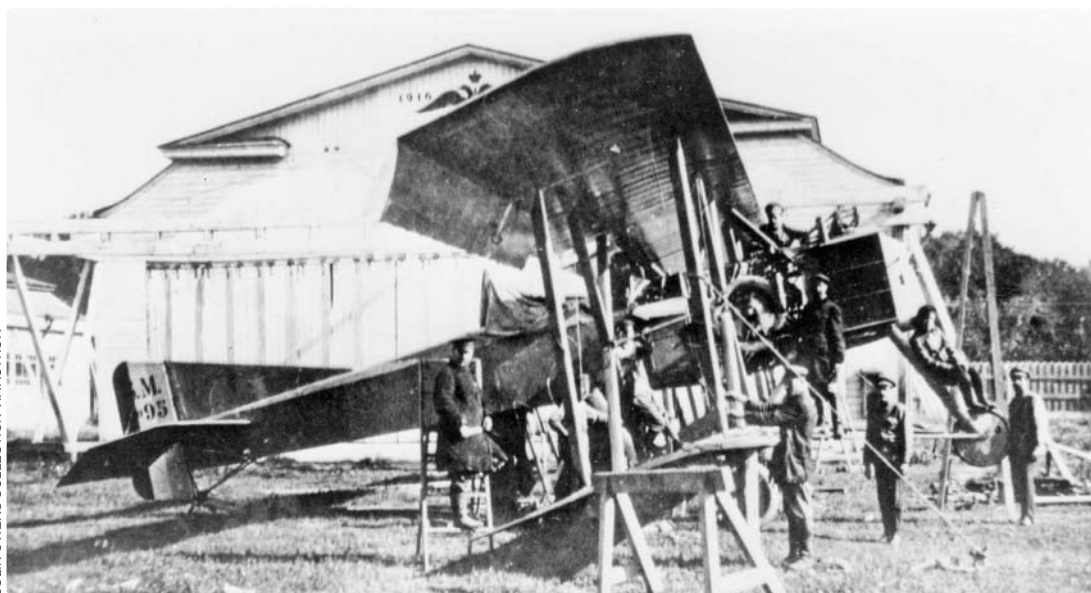


the 6^{ème} Salon de la Locomotion Aérienne in the Grand Palais in Paris, December 1919–January 1920. Retained same wing arrangement as C1 fighter and to be powered by a 180 h.p. Hispano-Suiza HS 8Ab engine. Span 8.5m (27ft 10¾in); wing area 16m² (172ft²); loaded weight 670kg (1,477lb)

1922 Worked for *Établissements Henri Dits*; designed biplane flying-boat *Hydravion Colonial* for *Société des Transports Aériens Guyanais* (Guyanese Air Transport Corporation). To be powered by 300 h.p. Renault 12Fe engine; wingspan 15.6m (51ft 2in). Not known if it was ever built and flown

1923 Light monoplane designated Dits-Moineau Type X. No fuselage; pilot sat inside the wing; elevators hinged at the tips of the wing. Empty weight 140kg (308lb). Power provided by a 140 h.p. Sergeant engine. Only one Type X was ever built and took part, without success, in *Le Grand Prix du Petit Parisien* in 1923 **AJP**





ABOVE In 1917 two SM-1s were acquired by the Russian Air Fleet for evaluation and tested at Khodynka, near Moscow, possibly where this photograph of No 95 was taken — note the Tsarist air force insignia on the hangar behind. Unsurprisingly, the Russians found the SM-1 as troublesome to operate and maintain as did the French.

tailskid had to reach the ground very quickly in order to be used as a brake.

When the war came to an end, one SM-1 was fitted with a second Salmson 9 A2C engine (in the nose), enlarged wings, additional struts and a reinforced undercarriage, to become the SM-2. During flight tests held in 1918 the aircraft encountered serious problems with its engine-cooling system. Nothing else is known about these flights, and this unique aircraft apparently vanished as quickly as it had appeared.

After the war René Moineau continued to design aircraft (see panel on pages 118–119), including a monoplane fighter with a retractable undercarriage fitted with a 300 h.p. Hispano-Suiza engine. This eventually gave birth to a racing aircraft completed at the Louis Clément factory in Boulogne-sur-Seine, the aircraft later being exhibited at the 1919 *Salon de la Locomotion Aérienne* in the Grand Palais in Paris.

Virtually nothing remains of the front end of SM-1 No 4, which obviously hit the ground very hard indeed. The large “6” on the upper wing suggests that the aircraft was probably being used by an operational escadrille at the time of the accident.

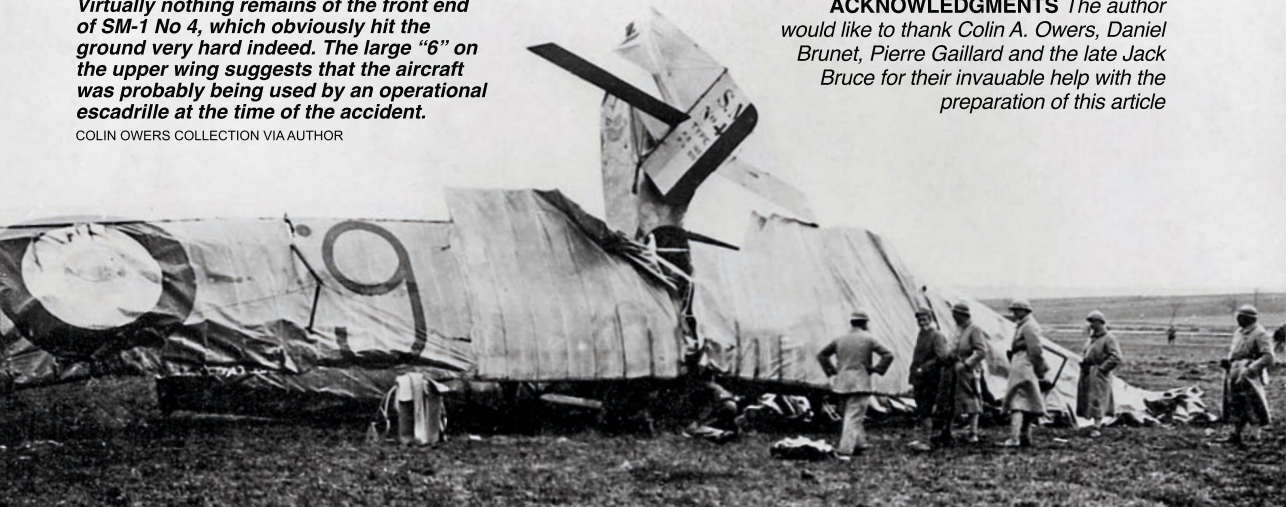
COLIN OWERS COLLECTION VIA AUTHOR

As for the SM-1s, it seems that not a single example survived the war. They were promptly dropped from the inventory and scrapped in due course. In May 1924 Moineau created his own company, Avions René Moineau, the aim of which was to build a flying machine with a rotating wing, prefiguring the later development of the practical helicopter.

During this period, Moineau patented more than 50 of his inventions, some of which came to be well-known worldwide, particularly his design for a compressor which used his theory of “capsulism”, in which an eccentric rotor rotates in a helical stator. In 1932 he established a new enterprise, PCM (*Pompe Compresseur Mécanique*), which still exists today. In 1948 Moineau relocated to Belgium, planning to emigrate to the USA to continue his engineering work. It was not to be — René Moineau died in Brussels on October 5, 1948, at the age of 61.



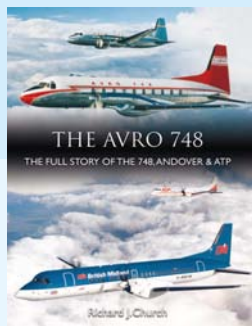
ACKNOWLEDGMENTS The author would like to thank Colin A. Owers, Daniel Brunet, Pierre Gaillard and the late Jack Bruce for their invaluable help with the preparation of this article



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THE AVRO 748 **The Full Story** **of the 748,** **Andover & ATP** *Richard J Church*

This publication is a very much updated version of the original 'British Aerospace 748' published in 1986. It has now been expanded to include the ultimate twin turboprop airliner from the Chadderton/Woodford stable, the British Aerospace Advanced Turboprop or ATP. In the twenty-nine years since the original book was published there have been many additional operators throughout the world although today, numbers in use are fast depleting as newer more economic types have come onto the market. The use of HS 748s and Hindustan Aeronautics 748s is now confined to Canada, East Africa, Bangladesh, India, Nepal and Thailand, mainly in the freight role, while only a single Andover C.Mk.1 is believed to remain operational, flying in Kenya and South Sudan.

The BAe ATP sold in relatively small numbers and most have been converted to pure freighters with only NextJet in Sweden operating passenger versions. Examples of converted pure freight versions are operated throughout Europe and to North Africa by West Atlantic Airlines, and two more are operating in Indonesia.

This book describes the development history of each type including the Hindustan Aeronautics 748, providing performance and dimensional data and highly detailed individual histories of all the aircraft built. Details of every operator of each type throughout the years and the utilizations of each aircraft are also recorded together with detailed line drawings (including those of several little-known projected versions) and a comprehensive collection of photographs. A welcome additional feature is a fully-searchable CD that is included with the book and includes the histories of each aircraft in linear format and full operator histories. 304 pages plus over 300 photographs & drawings.

Members: £34.95. Non-Members: £47.50

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THE **SQUADRONS** **AND UNITS** **OF THE** **FLEET AIR ARM**

*Theo Ballance, Lee Howard,
Ray Sturtivant*

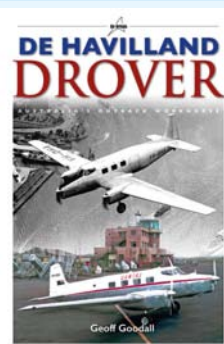
The result of unparalleled research using information gathered from a wide range of sources, including Museum and National Archive records, Squadron and Flight diaries,

Navy Lists, individual Flying Log Books, aircraft records, reference works, photographic records, contemporary newspaper reports and the magazines, reports and websites of various naval and aviation historical societies and associations,

THE SQUADRONS AND UNITS OF THE FLEET AIR ARM is the standard and most authoritative reference work on the subject. 512 pages of information, much of it never published, contain brief histories of every Naval Air Squadron – including Australian, Canadian and Dutch squadrons.

Illustrated throughout by more than 800 photographs and over 180 squadron, ship and unit badges, mostly in colour.

Members: £34.95 Non-members: £47.50



DE HAVILLAND **DROVER** **Australia's Outback** **Workhorse** *Geoff Goodall*

Flying across the Australian Outback, Papua New Guinea and the Pacific Islands, the story of the de Havilland Australia Drover is told in marvellous detail by acclaimed Australian aeronautical historian Geoff Goodall.

Demonstrating that it most definitely was not a Dove with an extra engine, he explains the genesis and design of the Drover as a replacement for the pre-war Dragon. The issue with the variable pitch propellers, which arguably sealed the commercial fate of the aircraft, is examined together with the attempts to solve this and the subsequent fitting of Lycoming engines.

The type's service with Qantas, TAA, the Royal Flying Doctor Service and subsequent third level operators is dealt with in detail. As with all Air-Britain books there is a comprehensive production history of all the aircraft produced.

There are excellent drawings by Juanita Franzi and over 160 photographs, the majority of which have not been in a published book before.

Members: £14.95. Non-Members: £19.95



ARMCHAIR AVIATION

We take a look at what's available for the aviation history enthusiast in the world of books and other literature, from hot-off-the-press publications to reissued classics

Hand-Coloured New Zealand — The Photographs of Whites Aviation

By Peter Alsop; Potton & Burton, 98 Vickerman Street, Nelson, New Zealand (e-mail info@pottonandburton.co.nz); 10¼in x 12in (276mm x 305mm); hardback with jacket; 408 pages; illustrated; NZ\$79.99. ISBN 978-0-947503-15-4

PERHAPS FOR MANY of us these days, that unique thrill of seeing your place from the air for the first time has been dulled by succeeding experiences in, and familiarity with, flying. For some of the more “silvered” of us, that thrill had much to do with the more general marvel of witnessing flight in the first place.

One of the central pleasures of this beautifully-produced book is that it recalls and refreshes such thrills. For example, it made me remember the excitement of the arrival of a top-dressing Auster as seen from a bedroom window very early one bright summer morning in the 1950s. Notice of the beginning of the day's work was, traditionally, the homestead being beaten up by a pilot who had once flown Spitfires, Hurricanes and Corsairs. This book does much more too, however, including celebrating the art of hand-colouring photographs and recording the history of the emergence of New Zealand's own individual identity.

The author has cleverly settled on presenting a combination of subjects which derive from the legendary work of Whites Aviation, from the company's establishment in 1945 through to the 1990s (in various incarnations). Although Whites never owned an aircraft, its accomplished founder, former newspaper photographer Leo White, and his equally remarkable fellow lensman Clyde Stewart, flew all over New Zealand taking high-quality aerial photographs.

These gave New Zealanders comprehensive views of their country for the first time, be it magnificent landscapes of a nation notoriously blessed with scenic wonders — then often unseen by most — or particular towns and

farmsteads; a staple of Whites' business was selling photographs of the latter to the respective farm owners.

The book will naturally be popular with New Zealanders and all interested in the nation and its history, but it is also of more general interest as a study of the people involved, including the highly talented and industrious hand colourists — “the colouring girls” — whose artistry (with cotton wool), give these photographic works their special character.

Necessarily, there is a very strong historic aviation character to the book, and in addition to wonderful contemporary aerial images there are engaging images of aircraft and aviators of the period, including an Avro Avian, a ski-shod Auster in the Southern Alps, a whitebaiting de Havilland Fox Moth on the South Island's west coast, Jean Batten's 1936 arrival in her Percival Vega Gull, “Smithy” and various flying-boats, among numerous others.

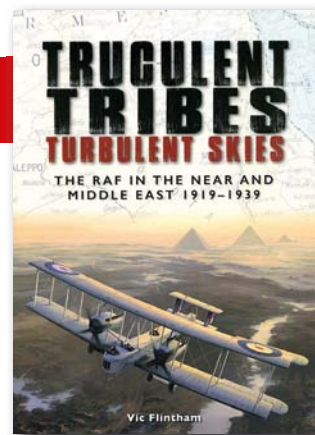
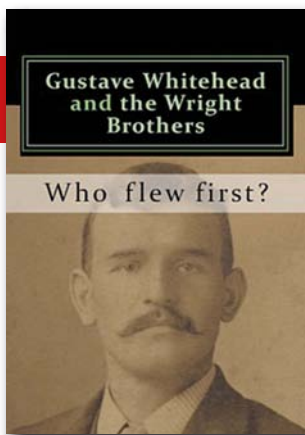
The production of the book is outstanding, as might be expected from this publisher, which now has an excellent reputation for Kiwi-oriented natural history, photography and large-format publishing. This substantial tome is large, heavy and expensive; all points which are more than justified by the supremely handsome result.

JAY CASSELLS

Gustave Whitehead and the Wright Brothers: Who flew first?

By John Brown; CreateSpace Independent Publishing Platform, Future Concepts GmbH, Jollystrasse 4, 81545 Munich, Germany; 7in x 10in (178mm x 254mm); softback; 508 pages, illustrated; £27.95. ISBN 978-1-532899-39-3

MARCUS AURELIUS WROTE: “A man does not sin by commission only, but often by omission”. This self-published volume overflows with “sins” of both kinds, and it would take



another book to list all the things that are wrong with this one; its deceptions and distortions, misrepresentations, serious omissions and specious arguments and assertions that do not bear close examination.

One example of deception directly concerns this reviewer. The author quotes my statement in this journal that a compressed-air engine could not be used to power a full-size manned aeroplane, but the quote is taken out of context. Where it should have been used, the issue in question is totally avoided and the important relevant text is omitted. The Lamson patent of 1901 is clearly misinterpreted, and the author resurrects old contentions in which he has already been proved wrong. Moreover, he seems to hold the naïve belief that, because a newspaper report is widely syndicated, it must therefore be true.

He has endeavoured to present his “evidence” as though he were in a court of law, but the “court” he has created is a surreal sort of pseudo “kangaroo court”, in which the presiding judge and the counsel for the prosecution have been locked out. The only people present in the courtroom (the book) are the counsel for the defence (the author), its client (Gustave Whitehead, a persistent offender prone to making exaggerated and unsubstantiated claims), a bunch of witnesses for the defence (many of dubious credibility), and a largely innocent and unsuspecting jury (the readers).

One can envisage a counsel for the prosecution objecting to the counsel for the defence persistently withholding vital relative evidence that would prejudice his client’s case, and with wilfully leading (i.e. misleading) the jury. However, there is no counsel for the prosecution. The author then tries to act as unchallenged counsel for the prosecution against the Wrights and his presentation is equally unfair and unbalanced.

This unconventional and flawed concept is not conducive to serious history, and makes it

virtually impossible to regard this book as such. It more closely resembles hard-line propaganda or evangelism. It is easy to preach to the converted. This simply requires one to say what they want to hear, but this is not the way of a true historian, it is merely a way of promoting a cause (or of presenting a conspiracy theory). Such a presentation also prevents the general reader from gaining a balanced impression of Whitehead’s work.

If the author thinks this review unfair, perhaps he should realise that it merely reflects the nature of his book. His imaginative approach to his subject leads one to conclude that he has either failed to grasp the disciplines of history or has chosen to disregard them. There is an overall impression that the book embodies an attempt to assert control over the readers’ understanding, rather than present them with a complete and open-minded account. He has also endeavoured to exert control over who reviews his book. In the end, this does not reflect well upon its ostensible hero, Gustave Whitehead.

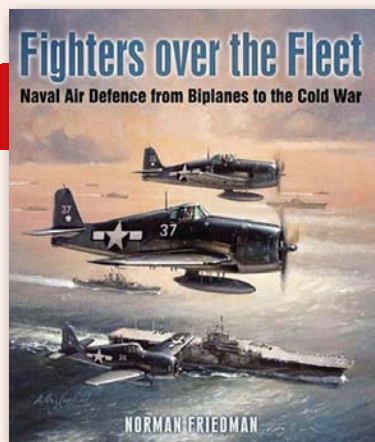
PHILIP JARRETT

Truculent Tribes, Turbulent Skies — The RAF in the Near and Middle East, 1919–1939

By Vic Flintham; Air-Britain Publishing, available from Air-Britain (Trading) Ltd, Causeway House, Chiddingstone Causeway, Tonbridge, Kent TN11 8JP; 8½in x 12in (220mm x 305mm); hardback; 304 pages, illustrated; £52.50 inc p&p in UK (A-B members pay £34.95). ISBN 978-0-851304-68-7

POINT ME AT a book with a Vickers Vimy flying over the Pyramids on the cover, and I’m happy. In case the foregoing statement is mystifying, I should add that, in my previous life as Editor of *Aeroplane* magazine, I was lucky enough to live the Vimy / Pyramids dream in 1999; it remains my most treasured aviation memory.

I shall not let that colour my appraisal of this



pricey volume, however, which is at its heart a history of British imperial air policing — the enforcement of rule, using aircraft, in a fractious part of the world where projection of power in hostile conditions on the ground has always been problematic.

The book is far more than that, though; it puts the RAF's activities in a wider geographical context, stretching from the Balkans and the eastern Mediterranean to Arabia and the Horn of Africa. It also addresses the wider historical context: the RAF's struggle to survive as an independent Service in the aftermath of World War One, and the boost that air power's effectiveness in the Middle East gave it; the importance of trade and (increasingly) oil in the area; and the unlikely hothouse these times and places provided for the development of individual air force officers who would go on to make a pivotal contribution to victory during World War Two.

The author also tackles allegations that the RAF deployed gas or chemical weapons in Iraq during the inter-war period; accusations that have resurfaced in the media in recent years in the context of Saddam Hussein. He convincingly dismisses them.

Comprising 15 chapters, the main body of the book begins with the splitting-up of the Ottoman Empire, and early revolts in Egypt and what were then Somaliland and Palestine during 1919–20. It ends with the lead-up to the Second World War, the air-power lessons learned in the 20-year period in question, and a “where are they now?” summary of the lands discussed, from Abyssinia to Syria.

All this may sound a bit dry — but it's not: it is actually a cracking read, full of vivid narrative and peppered in places with personal recollection. The text is well illustrated with getting on for 600 black-and-white photographs, 22 maps (essential in this type of survey), 40 tables and four evocative

colour paintings by Nicholas Trudgian.

Seven appendices complete the package — plus a prologue contrasting three very different bombing missions over Iraq, spanning 78 years.

So, my verdict, uncoloured by the rose-tinted lenses of my own happy memories, which themselves are at odds with the hardship and misery suffered for centuries by so many in this cauldron of conflict? Absolutely first class, and worth even the non-Air-Britain-member price.

MICK OAKEY

Fighters Over the Fleet: Naval Air Defence from Biplanes to the Cold War

By Norman Friedman; Seaforth Publishing, Pen & Sword Books Ltd, 47 Church Street, Barnsley, S70 2AS; 10in x 11½in (258mm x 300mm) hardback; 460 pages, illustrated; £45. ISBN 978-1-848324-04-6

WRITING AS AN author who has attempted several titles on naval aviation-related subjects, it can be hard to know where to draw the line. How much, for example, should you include on contemporary doctrine when writing about equipment? Or equipment when writing about operations? Or operations when writing about doctrine? In *Fighters Over the Fleet*, Norman Friedman seeks to take one relatively narrow (but nonetheless vast) area of naval aviation — that of fighter air defence of the fleet — and comprehensively study all three of those aspects, from the birth of naval flying through to the Cold War. As if that ambition wasn't great enough, Friedman chooses to do this not just for one service, but for the three main carrier navies of the 20th Century; the Royal Navy, US Navy and Imperial Japanese Navy. This is a sensible decision, as it takes in the most of the relevant history while not overburdening the narrative with extraneous detail. Nevertheless, this is a large book, boasting 450+ pages of sometimes

PROP-SWING

Edited by Bill Grigg, e-mail via svas@shuttleworth.org; 6in x 8¼in; 48 pages, illustrated; free to members of the Shuttleworth Veteran Aeroplane Society, Old Warden Aerodrome, Biggleswade, Bedfordshire SG18 9EP (annual membership £30); published three times a year. Website www.svasweb.org

THE OFFICIAL JOURNAL of the Shuttleworth Veteran Aeroplane Society — the Registered Charity which helps to support the famous Shuttleworth Collection of (mostly) active historic aircraft and vehicles — *Prop-Swing* is a well-established and thriving mini-magazine which keeps members in touch with developments at the Collection and also offers historical articles.

The Winter 2016 issue includes a feature on the privately-owned Ryan STA which is now resident at Old Warden; a brief look at the steam railcars produced by Clayton Wagons, an offshoot of the Clayton & Shuttleworth family engineering company; an article by *TAH* Editorial Board member Philip Jarrett on the late and great historian J.M. Bruce's remarkable but hidden talent as an aviation artist; and some musings by Editor Bill Grigg on the sometimes odd choices made by the makers of diecast metal toy aeroplanes. All these are mixed in with the regular selection of Shuttleworth aero workshop reports (with interesting illustrations of restorations/overhauls in progress), Chairman's letter, library, marketing, vehicle and photographic section updates, book reviews and more.

MO

dense text, liberally illustrated, in a "coffee-table" format.

We start with a description of the three navies under consideration, then look at the development of aircraft up to and including the Second World War, with and without radar. An account of air defence during the Second World War follows, including the initially successful use of radar control and its collapse under the weight of kamikaze attacks. Post-war development through Korea, Vietnam and the Falklands follows.

The text is well-balanced, providing ample depth without getting bogged down in minutiae. The sections on aircraft development are particularly interesting, covering often-neglected areas of naval aircraft evolution, such as the short-lived experiments with mixed-power fighters. There are numerous contemporary three-view drawings of unbuilt projects overtaken by circumstances.

Naturally, even a study such as this, which sets its boundaries clearly, must establish context outside them. Inevitably, the author considers the development of aircraft carriers and the changing focus of their employment — do they principally exist for the defence of the big-gun ships of the fleet from air attack? Or for attacking other fleets at sea? Or even, as with American doctrine during the early Cold War, to provide an advanced platform for strikes on enemy bomber bases?

The real benefit of this book is the thorough treatment of doctrine as it was influenced through experience and as a result of the development of equipment, such as radar or the jet engine. The study of equipment and tactics in the context of perceived future threats (rather than existing threats) is enlightening, and explains many puzzling procurement decisions.

Aside from a few minor assertions I took issue with (for example, the Blackburn Firebrand's centre section was widened simply to allow space for the torpedo carriage gear, not "to

provide enough lift"; the Blackburn Skua did not have poor deck-landing characteristics — in fact they were good), the author provides a very compelling argument, well reinforced with primary sources. It is highly recommended for anyone with an interest in naval aviation, and is a superb reference.

MATTHEW WILLIS

Inside: Polish Aircraft (1939) Instrument Panels

By Dariusz Karnas; Mushroom Model Publications, 3 Gloucester Close, Petersfield, Hampshire GU32 3AX; 8½in x 12in (220mm x 305mm); hardback; 40 pages, illustrated; £15. ISBN 978-8-365281-40-17

NICHE-WITHIN-a-niche specialism is a source of utter joy to most of us, and things don't get much more specialist than this book.

This latest slim volume in MMP's *Inside* series is the perfect reference source for any modeller who has chosen an early-World War Two Polish aircraft as his or her subject — and indeed any modeller who might do so in the future and likes to be prepared.

The book covers six types — PZL P.11c, PZL.37 Łoś, PZL.23 Karaś, Lublin R-XIII ter, RWD-14 Czapla and PWS-26. For each one a full-page colour instrument-panel artwork is provided, plus a same-size key, enlarged artworks of individual instruments, and black-and-white photographs of the aircraft and its cockpit.

In the case of the PZL.37, a link and QR code are provided, giving online access to an interactive version of the artwork. And that's it. A hardback book, printed on good glossy paper, might seem lavish treatment for six instrument panels. But if you've got to have it, you've just got to have it.

MICK OAKEY



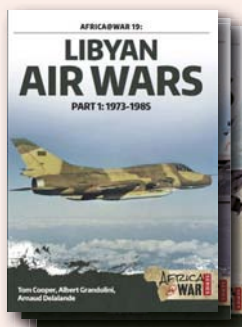
BOOKS IN BRIEF

A quick round-up of what else is currently available for the aviation history enthusiast

LIBYAN AIR WARS Pts 1–3 T. Cooper, A. Grandolini & A. Delalande

Helion & Company Ltd; £16.95

THIS EXCELLENT three-part softback series — the 19th, 20th and 21st volumes in Helion's superb *Africa@War* series — details the long-running and largely forgotten series of conflicts in which Libya got embroiled with, well, everybody, during 1973–89. The authors, all renowned for the depth of their research into the less well-known corners of military aviation history, have provided the definitive work on an obscure but fascinating chapter in the region's endless saga of misrule and chaos. From Chadian Skyraiders to US Navy Tomcats, the Libyans took them all on. **TAH-recommended. NS**

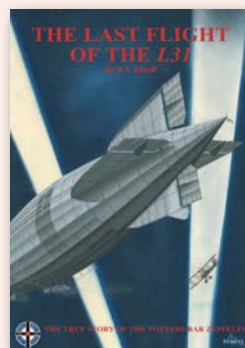


THE LAST FLIGHT OF THE L31

R.L. Rimell

Albatros Productions; ISBN 978-1-906798-47-5; £10

ANOTHER EXCELLENT monograph from Ray Rimell's Albatros Productions, this volume tells the story of the "Potters Bar Zeppelin", brought down on October 1, 1916. It is packed tight with information and rare illustrations, and includes extensive biographical coverage of the airship's commander, *Kapitänleutnant* Heinrich Mathy. A companion volume, *The Last Flight of the L32*, tells the story of the "Billericay Zepp", brought down on September 24 the same year; it includes artwork and drawings of L32's nemesis, Frederick Sowrey's Royal Aircraft Factory B.E.2c. **MO**

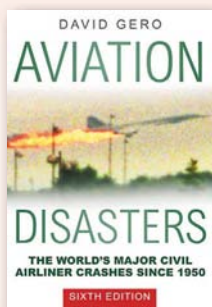


AVIATION DISASTERS: SIXTH EDITION

David Gero

The History Press; ISBN 978-0-750966-33-7; £25

FIRST PUBLISHED in 1993, David Gero's perennially compelling compendium of aircraft accidents involving 80 or more fatalities gets another paperback re-airing by the History Press. As with previous editions, Gero presents the facts with a commendable lack of sensationalism, each entry being a minor masterpiece of concision. So what's new in this updated sixth edition? Using an Avro Tudor crash in Wales in March 1950 as his starting point, Gero brings his comprehensive directory up to date, including the shocking and much publicised loss of two Malaysian Airlines 777s in 2014. Not one for conspiracy theorists or sensation-seekers, this is a sobering, well-produced work of reference. **NS**



THE DE HAVILLAND DH.60 MOTH

Stuart McKay

Amberley Publishing; ISBN 978-1-445657-23-3; RRP £12.99

AS THE LONGSTANDING head honcho of the de Havilland Moth Club, the author of this briefish but fact-packed history of the innovative D.H.60 Moth is eminently qualified for the job; to tell the story of the legendary biplane that played a major part in securing the company's future. Usefully divided sequentially by year into nine chapters, from 1925 to "1933 and infinity", this small-format (6½in x 9in) softback details the genesis and evolution of one of Britain's most significant light aircraft. The reproduction of the numerous photographs is rather flat, but it is a good story, expertly told by a specialist. **NS**

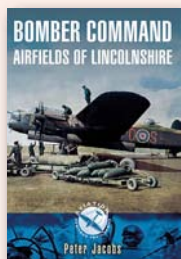


BOMBER COMMAND AIRFIELDS OF LINCOLNSHIRE

Peter Jacobs

Pen & Sword Aviation; ISBN 978-1-783463-34-3; £14.99

PART OF Pen & Sword's *Aviation Heritage Trail Series*, this 212-page 5½in x 8½in softback takes an in-depth look at the 29 airfields in Lincolnshire used by RAF Bomber Command during World War Two. Similar in concept to the well-known *Action Stations* series published by Patrick Stephens from the early 1980s, in which airfields were covered by region, these drill down into individual counties, and include a lot of new and valuable previously unpublished material. **NS**

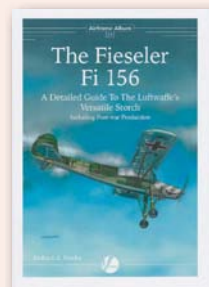


THE FIESELER Fi 156

Richard A. Franks

Valiant Wings Publishing; ISBN 978-0-9935345-6-0; £17.95

THIS LATEST addition to Valiant Wings's *Airframe Album* series — aimed mainly at modellers — presents a 21-page potted history of the spindly Storch followed by a cornucopia of external and internal details, well-illustrated with mono and colour photographs and artwork. It continues with the usual and very useful variant-by-variant sequence of isometric drawings, extensive camouflage-and-markings information and three specially-commissioned kit builds. A splendid 132-page manual for any detail fiend. **MO**



Lost & Found

PHILIP JARRETT explores the lesser-known corners of aviation history, discovering unknown images and rediscovering long-lost details of aircraft, people and events. This time he calls on readers to identify some vintage stars of the silver screen . . .

OVER THE YEARS I have amassed a collection of aviation movie stills and “lobby cards”, most of which are clearly identified, but in some cases information is lacking. Seen here are two such stills, both relating to American films and both depicting “crashes”.

The first relates to an inter-war film about First World War flying entitled *Young Eagles*, made by Paramount in 1930. The “crashed” aeroplane, with its pilot still in the cockpit, is evidently meant to represent a SPAD fighter in pseudo-American markings, but the “scalloped” trailing edges to the wings and tailplane have been painted on, so it would be nice to know just what the aeroplane really was. The biplane taxiing past on the left (somewhat distorted by the camera’s long lens) is an Alexander Eaglerock painted with German markings and with its in-line engine masked by a dummy cowling to give the impression that it has a rotary or radial engine. The location is Lake Sherwood, California.

The second image is obviously meant to show a Second World War training accident involving a Stearman PT-17 Kaydet, which has taxied at speed between two trees and had its wings torn off in the process. This still, bearing

the stamp of a photography studio of Detroit, Michigan, is dated August 14, 1958. The only complete visible marking is “302ED” on the port upper wing panel. The pilot has been identified as Paul Mantz. Can any aviation movie buffs provide further details?



ABOVE RIGHT Two Air Force officers scramble clear as a PT-17 is rendered wingless as it runs between two trees. What movie was this? **BELOW** A posed shot of a wrecked “SPAD”, presumably the “victim” of the pilot of the disguised “German” Alexander Eaglerock taxiing by on the left.



THE GRAVEYARD SHIFT

In 1965 **ED WILD FRAeS** was flying regular Douglas DC-3 services between the Channel Islands and the mainland for British United Air Ferries. One spring morning he was tasked with transporting a coffin from Jersey to Gatwick — a slightly macabre, if not that unusual, cargo. While preparing for the return flight, he noticed an oddly familiar item of freight . . .

IN THE MID-1960s a brush with the freight business came while I was employed as a Douglas DC-3 captain by British United Airways (BUA). Solid in every way, the DC-3 appeared to have been built by Isambard Kingdom Brunel and mechanical failures were rare. If there was one shortcoming, it was the climb up the steeply sloping cabin floor to get to the cockpit. Once the tail came up on take-off, the attitude levelled again and normality was restored. Flying the DC-3 was, as the late great American aviation columnist and author Len Morgan put it, “like dancing with your maiden aunt”.

In 1965 Jersey Airlines had fairly recently been taken over by BUA; but, apart from a new paint scheme, applied over time as aircraft went into the hangar for overhaul, the changes were mainly cosmetic: new brevet and cap badges for the aircrew, off-the peg uniforms from Uniform Stores at Gatwick instead of the upmarket gentleman’s tailor in St Helier, with its finest made-to-measure double-breasted heavyweight worsted. The new company nevertheless retained Jersey Airlines’s family feel and culture.



We carried bucket-and-spade families to the Channel Islands for sun-and-sea holidays — a novel and exciting adventure for many so soon after the end of wartime restrictions — and farmworkers from Brittany to help harvest the new-potato crop. There were also residents going in the other direction seeking to escape the confines of a small island.

A freight run would be a welcome change, and I found myself reporting on the morning of April 26, 1965, for an ad hoc flight from Jersey to Gatwick. Leafing through the list of goods to be carried aboard DC-3 G-AMZF, I saw that the cargo manifest listed a coffin containing the remains of a Mr da Silva, who had been killed 12 days before when BUA DC-3 G-ANTB, flying to Jersey from Paris, had crashed following an attempted landing on the island in poor weather conditions.

We completed the necessary formalities and were soon airborne in the stiff westerly breeze. Turning over St Ouen’s Bay on Jersey’s west coast, the five-mile-long beach seemed almost deserted, wearing an out-of-season look with only a few beachcombers and dog-walkers huddled against the breeze, salt crystals on the

INSET ABOVE *The author in a Douglas DC-3 in Somaliland during oil survey operations in December 1959. BELOW* Built as a C-47B and operated by the RAF as KN212 (and later XF749), DC-3 G-AMZF was acquired by Jersey Airlines in 1960, and was absorbed into the British United Airways fleet in August 1963, the same year it is seen here at Gatwick.

PETER KEATING © A FLYING HISTORY LTD





ABOVE The author photographed G-AMZF over the distinctive Fort de Querqueville to the west of Cherbourg Harbour from his own DC-3 during an (extremely) unofficial photo-sortie in May 1964. In 1966 the aircraft was sold to a new owner in Canada as CF-RTY (later C-GCUW), its long career finally coming to an end in the early 1980s.

sand below glittering in the sunshine.

Ahead, the island of Alderney was a grey smudge with Cherbourg just visible beyond. After passing Cap la Hague in Normandy, its nuclear fuel plant as yet only a scar on the landscape, we would be heading across the slate-grey Channel, leaving no wake, just the rumble of our twin Pratt & Whitneys on the sea air.

THE TURNAROUND

Mid-morning Gatwick was quiet. The turnaround went smoothly and the return freight load was lashed down — a contrast to the normal piled-up bundles of string-tied newspapers, ink still not dry, which was the load we usually delivered to the Islands every morning around 0500hr, and which left inky black smudges on our crisp white uniform shirts.

The DC-3 has large sliding cockpit windows which allow communication with the ground, and while the loaders closed the rear double doors, the agent, competing with the racket produced by a new-fangled jet having its engines started nearby, cupped his hands and called up to the cockpit: "Can you accept a late item of freight for Jersey?" After I had answered

with a thumbs-up, the rear doors were opened again and, looking back out of my side window to see what was being loaded, I was surprised to see a coffin being lifted on; two in one day — what an amazing coincidence!

I decided to investigate and made my way to the rear down the shiny metal floor. I saw at once that the coffin was the same one we had delivered earlier, Mr da Silva's name prominent on the lid. I started to say "there's some mistake" when an agent bustled up breathlessly, waving a newly-arrived telex from Operations Jersey. It informed me that the deceased's family in Portugal had "now declined to accept the body and you are to return it to Jersey".

On May 5, 1965, the day of the funeral, I was flying again, and unable to attend when Sr Joas Teixeira da Silva of Lisbon was buried at Surville Cemetery, St Helier, with all expenses paid by BUA. His grave is still there today.

Amen Mr da Silva, whoever you were . . .





OFF THE BEATEN TRACK

PHOTOGRAPHS BY THE AUTHOR

*Ever turned a corner to find something unexpected? The Aviation Historian's intrepid aeronautical explorer **PETER DAVISON** investigates the stories behind the oddities that turn up in the most unusual places . . .*

WELCOME TO the Caribbean, world-renowned for carnival, palm-fringed beaches and, here in Trinidad, hummingbirds hanging seemingly motionless in the rainforest. Beyond the luxury resorts lies a fragile infrastructure reliant on tourism.

This former British West Indian Airlines (BWIA) Lockheed L-1011-500 TriStar stands beside the nascent Chaguaramas Military Museum west of Trinidad's capital, Port of Spain. The location is on the site of an American naval base and US Coast Guard Station. The entire peninsula was leased to the USA during 1940–63.

The TriStar, c/n 1191, registered 9Y-TGN, was delivered new to BWIA on August 14, 1980, named *Sunjet Barbados*. It completed more than 20,000 flights and accrued some 60,000 flying hours before it was finally retired in March 2001. Gradually stripped of parts while sitting at Piarco International Airport, it was destined for the scrapman's torch until the museum expressed an interest in acquiring it in 2004. Cash-strapped BWIA offered no assistance but set a 60-day deadline for its removal and 20-mile journey.

The local defence forces still have their headquarters next door, so, as the port wing would overhang their territory, it could not be reattached. The plan was to relocate much of the museum display and facilities inside the TriStar by 2005, but a 2016 visit revealed that very little progress has been made.



TOP, ABOVE & BELOW Looking somewhat tatty in 2016, Lockheed L-1011-500 TriStar 9Y-TGN sits outside at the Chaguaramas Military Museum near Port of Spain. The capacious interior awaits fitting-out, although the cockpit (above) is largely complete. To get a bird's-eye view of the airliner on Google Earth, enter 10.683810, -61.614650 in the Search box.





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